

Section cross-reference(s): 49, 72

graphite modification sulfuric acid

thermal stability; anodic polarization pyrolytic graphite surface
morphol

Carbonyl group

Carboxyl group

Epoxy group

Phenyl group

(graphite intercalation compds. containing, from anodic polarization
of pyrolytic graphite in sulfuric
acid solution, thermal stability of)

IT 7664-93-9, Sulfuric acid, uses

RL: USES (Uses)

(anodic polarization by aqueous, of pyrolytic graphite, for
intercalation compds.)

IT 7782-44-7, Oxygen, occurrence

RL: OCCU (Occurrence)

(graphite intercalation compds. containing, from anodic polarization
of pyrolytic graphite in sulfuric
acid solution, thermal stability of)

IT 7782-42-5D, Graphite, intercalation compds.

RL: PRP (Properties)

(stability of, derived from anodic polarization of pyrolytic
graphite in sulfuric acid solution)

L70 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1990:636610 HCAPLUS

DOCUMENT NUMBER: 113:236610

TITLE: Thermally expandable graphite having long-term
stability, and its manufacture

INVENTOR(S):

Suzuki, Takeshi; Sakagami, Haruo; Ihata,
Satoshi; Takagi, Tsutomu

PATENT ASSIGNEE(S):

Nippon Kasei K. K., Fukushima, Japan

SOURCE:

Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE:

Patent

LANGUAGE:

Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 02153811	A	19900613	JP 1988-306802	198812 06

PRIORITY APPLN. INFO.:

JP 1988-306802

198812
06

AB

The graphite, capable of forming inclusion compds. with H₂SO₄,
contains ≥1 mols (vs. H₂SO₄ other than H₂SO₄) alkali metals.
The graphite is prepared by treating graphite with concentrated
H₂SO₄ and an oxidizing agent, washing
the material with water to free-H₂SO₄ concentration ≤1
mol/kg (vs. solid to be washed), neutralizing the material
with aqueous alkali metal compound solution to alkali metal concentration
≥2 mols (vs. free H₂SO₄), and drying the material. Acrylic
paints containing the graphite had long-term stability and corrosion

02/20/2007

resistance.
 IC ICM C01B031-04
 ICS C09C001-46
 CC 57-8 (Ceramics)
 Section cross-reference(s): 42
 ST graphite sulfuric acid inclusion
 compd; coating paint expandable graphite
 IT Alkali metals, compounds
 RL: USES (Uses)
 (graphite-sulfuric acid inclusion
 compds. containing, for stability)
 IT 7440-09-7, Potassium, uses and miscellaneous 7440-23-5, Sodium,
 uses and miscellaneous
 RL: USES (Uses)
 (graphite-sulfuric acid inclusion
 compds. containing, for stability)
 IT 7782-42-5, Graphite-sulfuric acid
 inclusion compound, uses and miscellaneous
 RL: USES (Uses)
 (thermally expandable, alkali metal-containing, pH
 -controlled)

L70 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1985:564198 HCAPLUS
 DOCUMENT NUMBER: 103:164198
 TITLE: Recovery of valuable materials from spent
 manganese dioxide dry batteries
 PATENT ASSIGNEE(S): Japan Metals and Chemicals Co., Ltd., Japan;
 Nichiju Research Center K. K.
 SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 60096734	A	19850530	JP 1983-205258	198311 01
<--				
JP 03061730	B	19910920	JP 1983-205258	198311 01
PRIORITY APPLN. INFO.:				

AB Scrap batteries are processed for the recovery of Zn, Fe, and graphite. Thus, 20 spent dry batteries containing Zn 520, Mn 253, Fe 360, and graphite 106 g were crushed to destroy airtightness, and heated in a SiO₂ crucible at 500° (400-600°) for 3 h in a 20-kVA high-frequency furnace of condenser type. The Zn-rich condensed metal was dissolved in HCl, adjusted to pH 1-2 with NH₄OH, and passed through a Hg(II)-absorption resin column. The effluent was adjusted to pH 7, passed through a chelate resin column to recover Cd, Zn, and Pb, and concentrated to obtain aqueous NH₄Cl. Molten metal was separated from the solids in the crucible, dissolved in dilute HCl, mixed with aqueous H₂O₂, filtered from the precipitate containing Fe and Mn, stirred with

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Wayne Lange Examiner #: 60603 Date: 2-12-07
 Art Unit: 1754 Phone Number ~~30~~ 2-1353 Serial Number: 10/928255
 Mail Box and Bldg/Room Location: E09A29 Results Format Preferred (circle): PAPER DISK E-MAIL
(Remsen)

If more than one search is submitted, please prioritize searches in order of need.

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: Method for controlling the expansion properties of thermally expandable sulfuric acid-graphite particles and their use
 Inventors (please provide full names): Arne Reinheimer; Antje Wenzel

Earliest Priority Filing Date: 12-5-02

For Sequence Searches Only Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.

Please search claims 1-11, as attached hereto. Please note that claim 11 is limited to the sulfuric acid-graphite particles.

SCIENTIFIC REFERENCE BR
 Sci. & Tech. Info. Cntr

FEB 13

Pat. & T M Office

STAFF USE ONLY

	Type of Search	Vendors and cost where applicable
Searcher: <u>M&H</u>	NA Sequence (#) _____	STN <input checked="" type="checkbox"/> _____
Searcher Phone #: _____	AA Sequence (#) _____	Dialog _____
Searcher Location: _____	Structure (#) _____	Questel/Orbit _____
Date Searcher Picked Up: _____	Bibliographic _____	Dr. Link _____
Date Completed: <u>2/20/07</u>	Litigation _____	Lexis/Nexis _____
Searcher Prep & Review Time: _____	Fulltext <u>1</u>	Sequence Systems _____
Clerical Prep Time: _____	Patent Family _____	WWW/Internet _____
Online Time: _____	Other _____	Other (specify) _____

Claims

1. A method for controlling the expansion properties of thermally expandable sulfuric acid-graphite particles, wherein the sulfuric acid-graphite particles, produced by the reaction of graphite particles with sulfuric acid in the presence of an oxidizing agent, ^{are} washed with an aqueous washing liquid, containing the compounds affecting the expansion properties, to a pH ranging from 2 to 8, measured in the washing liquid separated from the washed sulfuric acid-graphite particles, and then dried.
2. The method of claim 1, wherein the sulfuric acid-graphite particles are washed with an aqueous washing liquid, containing the compounds affecting the expansion properties, to a pH ranging from 3 to 7.
3. The method of claim 1, wherein the washing liquid contains, as compound affecting the expansion properties of the sulfuric acid-graphite particles, at least one representative of the group comprising sulfates, hydrogen sulfates, sulfites, hydrogen sulfites, nitrates, phosphates, hydrogen phosphates dihydrogen phosphates and acetates of sodium, potassium, magnesium, manganese, iron, copper, zinc and aluminum; hydrogen peroxide, iodic acid, bromic acid, permanganic acid, perchloric acid and peroxydisulfuric acid; peroxides, iodates, bromates, permanganates, perchlorates and peroxydisulfates of sodium and potassium; sodium salts of benzenesulfonic acid, 1,3-benzenedisulfonic acid, C₁ to C₃₀ alkylbenzenesulfonic acid, naphthalenesulfonic acid, aromatic and aliphatic aminosulfonic acids, and C₁ to C₃₀ alkylsulfonic acids, sodium C₁ to C₃₀ alkyl sulfates; sodium salts of saturated or unsaturated aliphatic C₂ to C₃₀ carboxylic acids; and saturated or unsaturated, aliphatic, quaternary ammonium salts of formula N(R)₄⁺X⁻, in which R independently of one another represents C₁ to C₃₀ alkyl groups and X⁻ represents an anion, in dissolved or dispersed form.

4. The method of claim 1, wherein the washing liquid contains the compound, affecting the expansion properties, in a concentration of 10^{-5} to 10 moles/L and preferably of 10^{-4} to 1 mole/L.

5. The method of claim 1, wherein the washing liquid contains, as compound increasing the expansion volume (%/mg) of the sulfuric acid-graphite particles, at least one representative of the group comprising Na_2SO_4 , K_2SO_4 , MgSO_4 , CuSO_4 , ZnSO_4 , $\text{Al}_2(\text{SO}_4)_3$, $(\text{NH}_4)_2\text{S}_2\text{O}_8$, NaBrO_3 , CH_3COONa , NaH_2PO_4 , sodium benzenesulfonate, trisodium naphthalenetrisulfonate, sodium 1-butanesulfonate, sodium 1-decanesulfonate, sodium dodecylbenzenesulfonate, sodium toluenesulfonate, tetraethylammonium bromide, decyltrimethylammonium bromide, dodecyltrimethylammonium bromide, tetradecyltrimethylammonium bromide, octadecyltrimethylammonium chloride, sodium acetate, sodium propionate, sodium stearate, sodium oleate and sodium benzoate, in dissolved or dispersed form.

6. The method of claim 1, wherein the washing liquid contains, as compound increasing the expansion rate (%/°C) of the sulfuric acid-graphite particles in the onset region, at least one representative of the group comprising Na_2SO_4 , K_2SO_4 , MgSO_4 , MnSO_4 , CuSO_4 , ZnSO_4 , $\text{Al}_2(\text{SO}_4)_3$, $(\text{NH}_4)_2\text{S}_2\text{O}_8$, KMnO_4 , NaBrO_3 , H_2O_2 , NaNO_3 , NaH_2PO_4 , sodium benzenesulfonate, in a concentration of less than 0.0125 moles/L, sodium 1-butanesulfonate, sodium 1-decanesulfonate, sodium dodecylbenzenesulfonate, sodium toluenesulfonate, tetraethylammonium bromide, dodecyltrimethylammonium bromide, octadecyltrimethylammonium chloride, sodium acetate, sodium propionate, sodium stearate, sodium oleate and sodium benzoate, in dissolved or dispersed form.

7. The method of claim 1, wherein the washing liquid contains, as compound increasing the average expansion coefficient (per °K) of the sulfuric acid-graphite particles, at least one representative of the group comprising Na_2SO_4 , K_2SO_4 , MgSO_4 , MnSO_4 , CuSO_4 , ZnSO_4 , $\text{Al}_2(\text{SO}_4)_3$, $(\text{NH}_4)_2\text{S}_2\text{O}_8$, NaBrO_3 , NaH_2PO_4 , sodium

benzenesulfonate, sodium 1-butanesulfonate, sodium 1-decanesulfonate, sodium toluenesulfonate, tetraethylammonium bromide, decyltrimethylammonium bromide, dodecyltrimethylammonium bromide, tetradecyltriethylammonium bromide, octadecyltrimethylammonium chloride, sodium acetate, sodium propionate, sodium stearate, sodium oleate and sodium benzoate, in dissolved or dispersed form.

8. The method of claim 1, wherein the washing liquid contains as compound, lowering the expansion volume (%/mg) of the sulfuric acid-graphite particles at least one representative of the group comprising MnSO_4 , Fe_2SO_4 , KMnO_4 , H_2O_2 , NaNO_3 , sodium naphthalenesulfonate, disodium 1,5-naphthalenesulfonate and sodium caprylate, in dissolved or dispersed form.

9. The method of claim 1, wherein the washing liquid contains as compound, lowering the expansion rate (%/°C) of the sulfuric acid-graphite particles in the onset range, at least one representative of the group comprising FeSO_4 ; sodium benzenesulfonate in a concentration of ≥ 0.0125 moles/L, decyltrimethylammonium bromide, tetradecyltrimethylammonium bromide, sodium naphthalenesulfonate, disodium 1,5-naphthalenedisulfonate, trisodium naphthalenetrisulfonate and sodium caprylate, in dissolved or dispersed form.

10. The method of claim 1, wherein the washing liquid contains, as compound lowering the average expansion coefficient (per °K) of the sulfuric acid-graphite particles, at least one representative of the group comprising FeSO_4 , KMnO_4 , H_2O_2 , NaNO_3 , sodium naphthalenesulfonate, disodium 1,5-naphthalenedisulfonate, trisodium naphthalenetrisulfonate, sodium dodecylbenzenesulfonate and sodium caprylate, in dissolved or dispersed form.

11. Intumescent fire-retarding additives for producing fire-retarding compositions for sealing wall bushings and other openings in walls, floors and ceilings of buildings, comprising thermally expandable sulfuric acid-graphite particles, produced by the

reaction of graphite particles with sulfuric acid in the presence of an oxidizing agent, washed with an aqueous washing liquid, containing the compounds affecting the expansion properties, to a pH ranging from 2 to 8 measured in the washing liquid separated from the washed sulfuric acid-graphite particles, and then dried.



STIC Search Results Feedback Form

EIC17000

Questions about the scope or the results of the search? Contact *the EIC searcher* or contact:

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- I am an examiner in Workgroup: Example: 1713
- Relevant prior art **found**, search results used as follows:

- ☐ 102 rejection
- ☐ 103 rejection
- ☐ Cited as being of interest.
- ☐ Helped examiner better understand the invention.
- ☐ Helped examiner better understand the state of the art in their technology.

Types of relevant prior art found:

- ☐ Foreign Patent(s)
- ☐ Non-Patent Literature
(journal articles, conference proceedings, new product announcements etc.)

➤ Relevant prior art **not found**:

- ☐ Results verified the lack of relevant prior art (helped determine patentability).
- ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28

=> fil reg

FILE 'REGISTRY' ENTERED AT 16:47:26 ON 20 FEB 2007
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.
COPYRIGHT (C) 2007 American Chemical Society (ACS)

=> d his nofile

(FILE 'HOME' ENTERED AT 15:28:55 ON 20 FEB 2007)

FILE 'HCAPLUS' ENTERED AT 15:29:12 ON 20 FEB 2007

L1 1 SEA US2004166049/PN

FILE 'REGISTRY' ENTERED AT 15:30:31 ON 20 FEB 2007

L2 50 SEA (98-11-3/BI OR 10043-01-3/BI OR 10101-50-5/BI OR
L3 1 SEA 12777-87-6/RN
L4 4640 SEA 7782-42-5/CRN
L5 24539 SEA 7664-93-9/CRN
L6 59 SEA L4 AND L5

FILE 'HCAPLUS' ENTERED AT 16:01:00 ON 20 FEB 2007

L7 226 SEA L3
L8 300 SEA L6
L9 QUE OXIDIZ? OR HYDROGEN(W) PEROXIDE OR H2O2
L10 QUE AQUEOUS? OR AQ# OR WATER? OR H2O
L11 QUE PH
L12 QUE SULFURIC(W)ACID# OR H2SO4
L13 QUE GRAPHITE#
L14 770 SEA L12(3A)L13
L15 178 SEA (L7 OR L8 OR L14) AND L9
L16 QUE WASH###
L17 64 SEA L15 AND (L10 OR L16)
L18 18 SEA L15 AND L11
L19 10 SEA L18 AND L17

FILE 'REGISTRY' ENTERED AT 16:21:50 ON 20 FEB 2007

L20 1 SEA 64-19-7/RN
L21 1 SEA 71-91-0/RN
L22 1 SEA 98-11-3/RN
L23 1 SEA 112-03-8/RN
L24 1 SEA 127-09-3/RN
L25 1 SEA 137-40-6/RN
L26 1 SEA 143-19-1/RN
L27 1 SEA 532-32-1/RN
L28 1 SEA 657-84-1/RN
L29 1 SEA 822-16-2/RN
L30 1 SEA 831-59-4/RN
L31 1 SEA 1119-94-4/RN
L32 1 SEA 1119-97-7/RN
L33 1 SEA 1321-69-3/RN
L34 1 SEA 1655-29-4/RN
L35 1 SEA 1984-06-1/RN
L36 1 SEA 2082-84-0/RN
L37 1 SEA 2386-54-1/RN
L38 1 SEA 7487-88-9/RN
L39 1 SEA 7558-80-7/RN
L40 1 SEA 7631-99-4/RN
L41 1 SEA 7664-93-9/RN
L42 1 SEA 7733-02-0/RN

L43 1 SEA 7757-82-6/RN
 L44 1 SEA 7758-98-7/RN
 L45 1 SEA 7778-80-5/RN
 L46 1 SEA 7783-20-2/RN
 L47 1 SEA 7785-87-7/RN
 L48 1 SEA 10043-01-3/RN
 L49 1 SEA 13419-61-9/RN
 L50 1 SEA 14066-20-7/RN
 L51 1 SEA 25155-30-0/RN
 L52 1 SEA 26856-59-7/RN
 L53 33 SEA (L20 OR L21 OR L22 OR L23 OR L24 OR L25 OR L26 OR
 L27 OR L28 OR L29 OR L30 OR L31 OR L32 OR L33 OR L34 OR
 L35 OR L36 OR L37 OR L38 OR L39 OR L40 OR L41 OR L42 OR
 L43 OR L44 OR L45 OR L46 OR L47 OR L48 OR L49 OR L50 OR
 L51 OR L52)

FILE 'HCAPLUS' ENTERED AT 16:33:20 ON 20 FEB 2007

L54 392005 SEA L53
 L55 110 SEA L54 AND L15
 L56 10 SEA L55 AND L11
 L57 39 SEA L55 AND (L10 OR L16)
 L58 6 SEA L56 AND L57
 L59 10 SEA L58 OR L19
 L60 8 SEA (L56 OR L18) NOT L59
 L61 54 SEA (L17 OR L57) NOT (L59 OR L60)
 L62 QUE 50/SC,SX
 L63 QUE 49/SC,SX
 L64 QUE 58/SC,SX
 L65 0 SEA L61 AND L62
 L66 13 SEA L61 AND L63
 L67 0 SEA L61 AND L64
 L68 QUE PARTICL? OR MICROPARTICL? OR PARTICULAT? OR NANOPARTI
 CUL?
 L69 11 SEA L61 AND L68
 L70 9 SEA L59 AND (1907-2002)/PRY,PY,AY
 L71 8 SEA L60 AND (1907-2002)/PRY,PY,AY
 L72 11 SEA L66 AND (1907-2002)/PRY,PY,AY
 L73 9 SEA L69 AND (1907-2002)/PRY,PY,AY

=> fil hcap

FILE 'HCAPLUS' ENTERED AT 16:47:29 ON 20 FEB 2007

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2007 AMERICAN CHEMICAL SOCIETY (ACS)

=> d l70 ibib abs hitstr hitind 1-9

L70 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:509949 HCAPLUS

DOCUMENT NUMBER: 141:40383

TITLE: Expansion control in synthesis of
 graphite-sulfuric acid
 intercalation compounds as intumescent flame
 retardants and fire extinguishers

INVENTOR(S): Wenzel, Antje; Reinheimer, Arne

PATENT ASSIGNEE(S): Hilti AG, Liechtenstein

SOURCE: Ger. Offen., 15 pp.
 CODEN: GWXXBX
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 10256963	A1	20040624	DE 2002-10256963	20021205
			<--	
DE 10256963	B4	20061019		
CN 1513758	A	20040721	CN 2003-10124664	20031128
			<--	
AU 2003264649	A1	20040624	AU 2003-264649	20031202
			<--	
CA 2452228	A1	20040605	CA 2003-2452228	20031203
			<--	
KR 2004049268	A	20040611	KR 2003-87290	20031203
			<--	
JP 2004182593	A	20040702	JP 2003-404723	20031203
			<--	
EP 1439146	A2	20040721	EP 2003-104539	20031204
			<--	
EP 1439146	A3	20060830		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
HU 200304007	A2	20040728	HU 2003-4007	20031204
			<--	
US 2004166049	A1	20040826	US 2003-728255	20031204
			<--	
PRIORITY APPLN. INFO.:			DE 2002-10256963	A 20021205
			<--	

OTHER SOURCE(S): MARPAT 141:40383
 AB The expansion characteristics of sulfuric acid-graphite intercalation compound are controlled by contacting the graphite particles with H₂SO₄ in the presence of an oxidizing agent and an expansion-

influencing compound contained in the aqueous wash fluid until a pH of 2-8 (preferably 3-7) is achieved in the wash fluid. Suitable expansion-influencing compds. include inorg. sulfates, hydrogen sulfates, sulfites, hydrogen sulfites, nitrates, phosphates, hydrogen phosphates, dihydrogen phosphates, acetates, oxidizing agents, benzenesulfonates, arenesulfonates, aminosulfonates, metal organic sulfates, and tetra-C1-30-alkylammonium salts,. The layered, intercalated silicates have application as intumescent fire retardants and extinguishers, especially for construction materials.

IT 12777-87-6P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(expansion control in synthesis of graphite-sulfuric acid intercalation compds. as intumescent flame retardants and fire extinguishers)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

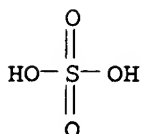
CCI MNS

C

CM 2

CRN 7664-93-9

CMF H2 O4 S

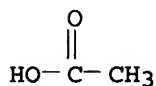


IT 64-19-7D, Acetic acid, salts 71-91-0, Tetraethylammonium bromide 98-11-3D, Benzenesulfonic acid, C1-30-alkyl derivs., sodium salt 112-03-8, Octadecyltrimethylammonium chloride 127-09-3, Sodium acetate 137-40-6, Sodium propionate 143-19-1, Sodium oleate 532-32-1, Sodium benzoate 657-84-1, Sodium toluenesulfonate 822-16-2, Sodium stearate 831-59-4 1119-94-4, Dodecyltrimethylammonium bromide 1119-97-7, Tetradecyltrimethylammonium bromide 1321-69-3, Sodium naphthalenesulfonate 1655-29-4, Disodium naphthalene-1,5-disulfonate 1984-06-1, Sodium caprylate 2082-84-0, Decyltrimethylammonium bromide 2386-54-1, Sodium 1-butanesulfonate 7487-88-9, Magnesium sulfate, uses 7558-80-7, Sodium dihydrogen phosphate 7631-99-4, Sodium nitrate, uses 7664-93-9D, Sulfuric acid, C1-30-alkyl esters, sodium salts 7733-02-0, Zinc sulfate 7757-82-6, Sodium sulfate,

uses 7758-98-7, Copper sulfate, uses 7778-80-5,
Potassium sulfate, uses 7783-20-2, Diammonium sulfate,
uses 7785-87-7, Manganese sulfate (MnSO₄)
10043-01-3, Aluminum sulfate 13419-61-9, Sodium
1-decanesulfonate 14066-20-7, Dihydrogen phosphate, uses
25155-30-0, Sodium dodecylbenzenesulfonate
26856-59-7, Naphthalenetrisulfonic acid, trisodium salt
RL: NUU (Other use, unclassified); USES (Uses)
(wash fluids containing; expansion control in synthesis of
graphite-sulfuric acid intercalation
compds. as intumescent flame retardants and fire extinguishers)

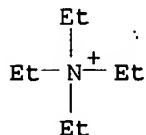
RN 64-19-7 HCAPLUS

CN Acetic acid (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 71-91-0 HCAPLUS

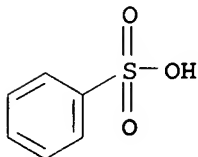
CN Ethanaminium, N,N,N-triethyl-, bromide (9CI) (CA INDEX NAME)



● Br⁻

RN 98-11-3 HCAPLUS

CN Benzenesulfonic acid (8CI, 9CI) (CA INDEX NAME)



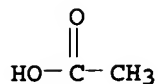
RN 112-03-8 HCAPLUS

CN 1-Octadecanaminium, N,N,N-trimethyl-, chloride (9CI) (CA INDEX NAME)



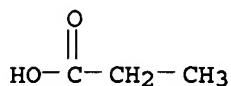
● Cl⁻

RN 127-09-3 HCAPLUS
CN Acetic acid, sodium salt (7CI, 8CI, 9CI) (CA INDEX NAME)



● Na

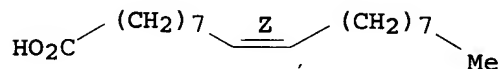
RN 137-40-6 HCAPLUS
CN Propanoic acid, sodium salt (9CI) (CA INDEX NAME)



● Na

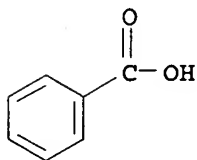
RN 143-19-1 HCAPLUS
CN 9-Octadecenoic acid (9Z)-, sodium salt (9CI) (CA INDEX NAME)

Double bond geometry as shown.



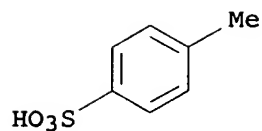
● Na

RN 532-32-1 HCAPLUS
CN Benzoic acid, sodium salt (8CI, 9CI) (CA INDEX NAME)



● Na

RN 657-84-1 HCAPLUS
CN Benzenesulfonic acid, 4-methyl-, sodium salt (9CI) (CA INDEX NAME)



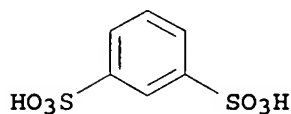
● Na

RN 822-16-2 HCAPLUS
 CN Octadecanoic acid, sodium salt (9CI) (CA INDEX NAME)



● Na

RN 831-59-4 HCAPLUS
 CN 1,3-Benzenedisulfonic acid, disodium salt (9CI) (CA INDEX NAME)



●2 Na

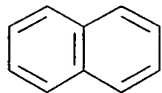
RN 1119-94-4 HCAPLUS
 CN 1-Dodecanaminium, N,N,N-trimethyl-, bromide (9CI) (CA INDEX NAME)

● Br⁻

RN 1119-97-7 HCAPLUS
 CN 1-Tetradecanaminium, N,N,N-trimethyl-, bromide (9CI) (CA INDEX NAME)

● Br⁻

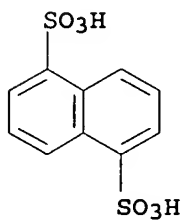
RN 1321-69-3 HCAPLUS
CN Naphthalenesulfonic acid, sodium salt (8CI, 9CI) (CA INDEX NAME)



D1-SO₃H

● Na

RN 1655-29-4 HCAPLUS
CN 1,5-Naphthalenedisulfonic acid, disodium salt (8CI, 9CI) (CA INDEX NAME)



●2 Na

RN 1984-06-1 HCAPLUS
CN Octanoic acid, sodium salt (8CI, 9CI) (CA INDEX NAME)

HO₂C-(CH₂)₆-Me

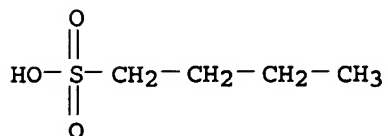
● Na

RN 2082-84-0 HCAPLUS
CN 1-Decanaminium, N,N,N-trimethyl-, bromide (9CI) (CA INDEX NAME)

Me₃⁺N-(CH₂)₉-Me

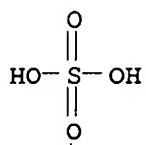
● Br⁻

RN 2386-54-1 HCAPLUS
 CN 1-Butanesulfonic acid, sodium salt (7CI, 8CI, 9CI) (CA INDEX NAME)



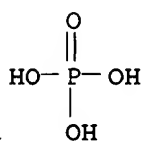
● Na

RN 7487-88-9 HCAPLUS
 CN Sulfuric acid magnesium salt (1:1) (8CI, 9CI) (CA INDEX NAME)



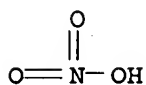
● Mg

RN 7558-80-7 HCAPLUS
 CN Phosphoric acid, monosodium salt (8CI, 9CI) (CA INDEX NAME)



● Na

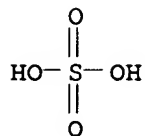
RN 7631-99-4 HCAPLUS
 CN Nitric acid sodium salt (1:1) (CA INDEX NAME)



● Na

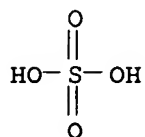
RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



RN 7733-02-0 HCAPLUS

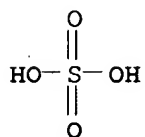
CN Sulfuric acid, zinc salt (1:1) (9CI) (CA INDEX NAME)



● Zn

RN 7757-82-6 HCAPLUS

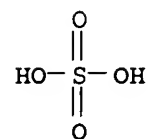
CN Sulfuric acid disodium salt (8CI, 9CI) (CA INDEX NAME)



●2 Na

RN 7758-98-7 HCAPLUS

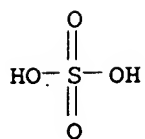
CN Sulfuric acid copper(2+) salt (1:1) (8CI, 9CI) (CA INDEX NAME)



● Cu(II)

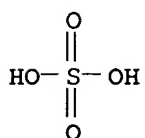
RN 7778-80-5 HCAPLUS

CN Sulfuric acid dipotassium salt (8CI, 9CI) (CA INDEX NAME)



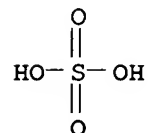
● 2 K

RN 7783-20-2 HCAPLUS
CN Sulfuric acid diammonium salt (8CI, 9CI) (CA INDEX NAME)



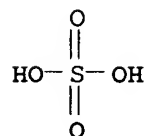
● 2 NH₃

RN 7785-87-7 HCAPLUS
CN Sulfuric acid, manganese(2+) salt (1:1) (9CI) (CA INDEX NAME)



● Mn(II)

RN 10043-01-3 HCAPLUS
CN Sulfuric acid, aluminum salt (3:2) (CA INDEX NAME)



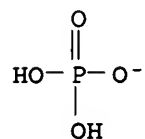
● 2/3 Al

RN 13419-61-9 HCAPLUS
CN 1-Decanesulfonic acid, sodium salt (6CI, 7CI, 8CI, 9CI) (CA INDEX NAME)

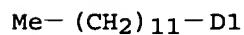
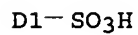


● Na

RN 14066-20-7 HCAPLUS
CN Phosphate, dihydrogen (8CI, 9CI) (CA INDEX NAME)

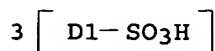
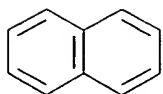


RN 25155-30-0 HCAPLUS
CN Benzenesulfonic acid, dodecyl-, sodium salt (8CI, 9CI) (CA INDEX NAME)



● Na

RN 26856-59-7 HCAPLUS
CN Naphthalenetrisulfonic acid, trisodium salt (7CI, 8CI, 9CI) (CA INDEX NAME)



●3 Na

- IC ICM C01B031-04
- ICS C09K021-02
- CC 50-6 (Propellants and Explosives)
- Section cross-reference(s): 49, 58
- ST intumescent fire retardant extinguisher **graphite**
sulfuric acid intercalation
- IT Sulfonic acids, uses
- RL: NUU (Other use, unclassified); USES (Uses)
- (C1-30-alkane, sodium salts, **wash** fluids containing;
- expansion control in synthesis of **graphite-**
- sulfuric acid** intercalation compds. as
- intumescent flame retardants and fire extinguishers)
- IT Carboxylic acids, uses
- RL: NUU (Other use, unclassified); USES (Uses)
- (C2-30, sodium salts, **wash** fluids containing; expansion
- control in synthesis of **graphite-sulfuric**
- acid** intercalation compds. as intumescent flame
- retardants and fire extinguishers)
- IT Sulfonic acids, uses
- RL: NUU (Other use, unclassified); USES (Uses)
- (amino, sodium salts, **wash** fluids containing; expansion
- control in synthesis of **graphite-sulfuric**
- acid** intercalation compds. as intumescent flame
- retardants and fire extinguishers)
- IT Fire-resistant materials
- (construction; expansion control in synthesis of **graphite**
- sulfuric acid** intercalation compds. as
- intumescent flame retardants and fire extinguishers)
- IT Construction materials
- (fire-resistant; expansion control in synthesis of
- graphite-sulfuric acid** intercalation
- compds. as intumescent flame retardants and fire extinguishers)
- IT Intumescent materials
- (fireproofing; expansion control in synthesis of **graphite**
- sulfuric acid** intercalation compds. as
- intumescent flame retardants and fire extinguishers)
- IT Phosphates, uses
- Sulfates, uses
- RL: NUU (Other use, unclassified); USES (Uses)
- (hydrogen, **wash** fluids containing; expansion control in
- synthesis of **graphite-sulfuric acid**
- intercalation compds. as intumescent flame retardants and fire
- extinguishers)
- IT Fire extinguishers

Fireproofing agents

(intumescent; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT Peroxides, uses

RL: NUU (Other use, unclassified); USES (Uses)
(oxidant, wash fluids containing; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT Amines, uses

RL: NUU (Other use, unclassified); USES (Uses)
(sulfo-, sodium salts, wash fluids containing; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT Quaternary ammonium compounds, uses

RL: NUU (Other use, unclassified); USES (Uses)
(tetraalkyl, tetra-C1-30-alkyl, wash fluids containing; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT Bisulfites

Nitrates, uses

Phosphates, uses

Sulfates, uses

Sulfites

RL: NUU (Other use, unclassified); USES (Uses)
(wash fluids containing; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT 12777-87-6P

RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT 7601-89-0, Sodium perchlorate 7601-90-3, Perchloric acid, uses
7681-55-2, Sodium iodate 7722-64-7, Potassium permanganate
7722-84-1, Hydrogen peroxide, uses 7727-21-1
7758-01-2, Potassium bromate 7758-05-6, Potassium iodate
7775-27-1, Sodium peroxodisulfate 7778-74-7, Potassium perchlorate
7782-68-5, Iodic acid 7789-31-3, Bromic acid 7789-38-0, Sodium bromate 10101-50-5, Sodium permanganate 13445-49-3, Peroxodisulfuric acid 13465-41-3, Permanganic acid
RL: NUU (Other use, unclassified); USES (Uses)

(oxidant, wash fluids containing; expansion control in synthesis of **graphite-sulfuric acid** intercalation compds. as intumescent flame retardants and fire extinguishers)

IT 64-19-7D, Acetic acid, salts 71-91-0,

Tetraethylammonium bromide 98-11-3D, Benzenesulfonic acid, C1-30-alkyl derivs., sodium salt 98-11-3D, Benzenesulfonic acid, alkyl derivs., sodium salt 112-03-8, Octadecyltrimethylammonium chloride 127-09-3, Sodium acetate 137-40-6, Sodium propionate 143-19-1, Sodium oleate 532-32-1, Sodium benzoate 657-84-1, Sodium toluenesulfonate 822-16-2, Sodium stearate 831-59-4 1119-94-4, Dodecyltrimethylammonium bromide 1119-97-7, Tetradecyltrimethylammonium bromide

1321-69-3, Sodium naphthalenesulfonate 1655-29-4,
 Disodium naphthalene-1,5-disulfonate 1984-06-1, Sodium
 caprylate 2082-84-0, Decyltrimethylammonium bromide
 2386-54-1, Sodium 1-butanesulfonate 7487-88-9,
 Magnesium sulfate, uses 7558-80-7, Sodium dihydrogen
 phosphate 7631-99-4, Sodium nitrate, uses
 7664-93-9D, Sulfuric acid, C1-30-alkyl esters, sodium salts
 7733-02-0, Zinc sulfate 7757-82-6, Sodium sulfate,
 uses 7758-98-7, Copper sulfate, uses 7778-80-5,
 Potassium sulfate, uses 7783-20-2, Diammonium sulfate,
 uses 7785-87-7, Manganese sulfate (MnSO4)
 10043-01-3, Aluminum sulfate 13419-61-9, Sodium
 1-decanesulfonate 14066-20-7, Dihydrogen phosphate, uses
 25155-30-0, Sodium dodecylbenzenesulfonate
 26856-59-7, Naphthalenetrisulfonic acid, trisodium salt
 RL: NUU (Other use, unclassified); USES (Uses)
 (wash fluids containing; expansion control in synthesis of
 graphite-sulfuric acid intercalation
 compds. as intumescent flame retardants and fire extinguishers)

L70 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2004:7129 HCAPLUS

DOCUMENT NUMBER: 141:127470

TITLE: Study of preparation of fine bud scale expanded
 graphite

AUTHOR(S): Liu, Guoqin; Yan, Min

CORPORATE SOURCE: Department of Physics, Panzhihua Institute,
 Panzhihua, 617000, Peop. Rep. China

SOURCE: Sichuan Daxue Xuebao, Ziran Kexueban (
 2002), 39(4), 716-720

CODEN: SCTHAO; ISSN: 0490-6756

PUBLISHER: Sichuan Daxue Xuebao Bianjibu

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB The expanded graphite with expansion coefficient of 180-200, ash content
 of 0.213-0.233%, and volatile substance content of 4.97-6.25% was
 prepared by acidifying 100-160 mesh fine bud scale graphite
 with H2SO4-HNO3 (5-7.5:1) for 20-30 min, oxidizing
 with KMnO4 for 20-30 min, adding FeCl3 (as inserting agent),
 stirring for 2-6 h, washing with water to
 pH 5-7, drying to water content of 10-20%, and
 expanding at about 1000°.

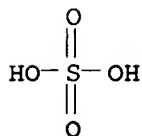
IT 7664-93-9, Sulfuric acid, uses

RL: NUU (Other use, unclassified); USES (Uses)

(acidifying agent; preparation of fine bud scale expanded graphite)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 57-8 (Ceramics)

Section cross-reference(s): 49

IT 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric acid,
 uses

RL: NUU (Other use, unclassified); USES (Uses)
 (acidifying agent; preparation of fine bud scale expanded graphite)
 IT 7722-64-7, Potassium permanganate
 RL: NUU (Other use, unclassified); USES (Uses)
 (oxidizing agent; preparation of fine bud scale expanded graphite)

L70 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1995:888076 HCAPLUS

DOCUMENT NUMBER: 123:261091

TITLE: Manufacture of low-sulfur content expandable graphite

INVENTOR(S): Song, Kemin; Lu, Wenyi; Gao, Shuying

PATENT ASSIGNEE(S): Peop. Rep. China

SOURCE: Faming Zhuanli Shenqing Gongkai Shuomingshu, 7 pp.
 CODEN: CNXXEV

DOCUMENT TYPE: Patent

LANGUAGE: Chinese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
CN 1102398	A	19950510	CN 1993-119757	19931105
CN 1039801	B	19980916	CN 1993-119757	19931105

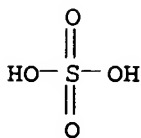
AB. The title process comprises the following steps: (1) oxidation: immersing flaky graphite in conductivity H₂SO₄ of 45-60°, adding soluble peroxydisulfate with agitation, and reacting for 0.5-3 h to obtain acidic graphite, (2) desulfurization: removing acid from the acidic graphite by centrifugation, placing in a liquid mixture of HNO₃ and oxalic acid, reacting at 25-30° for 2-6 h, removing acid by centrifugation, rinsing with water until pH 4-7, and drying by centrifugation, and (3) expansion: drying the desulfurized graphite at 40-60° for controlling water content at 0.5-1 weight parts, then expanding at 900-950°. Preferably, the soluble peroxydisulfate is NH₄-, Na- or K peroxydisulfate.

IT 7664-93-9, Sulfuric acid, uses

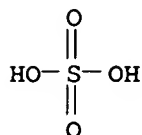
RL: TEM (Technical or engineered material use); USES (Uses)
 (concentrated; in manufacture of low-sulfur content expandable graphite)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IT 7783-20-2, Ammonium sulfate, formation (nonpreparative)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (formation of; in manufacture of low-sulfur content expandable
 graphite)
 RN 7783-20-2 HCAPLUS
 CN Sulfuric acid diammonium salt (8CI, 9CI) (CA INDEX NAME)



●2 NH₃

IC ICM C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)
 IT Peroxydisulfates
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (soluble, oxidizing agent; in manufacture of low-sulfur content
 expandable graphite)
 IT 7664-93-9, Sulfuric acid, uses
 RL: TEM (Technical or engineered material use); USES (Uses)
 (concentrated; in manufacture of low-sulfur content expandable graphite)
 IT 6484-52-2, Ammonium nitrate, formation (nonpreparative)
 7783-20-2, Ammonium sulfate, formation (nonpreparative)
 RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
 (formation of; in manufacture of low-sulfur content expandable
 graphite)
 IT 7727-21-1, Potassium peroxydisulfate 7727-54-0, Ammonium
 peroxydisulfate 7775-27-1, Sodium peroxydisulfate
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (oxidizing agent; in manufacture of low-sulfur content
 expandable graphite)

L70 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1994:110949 HCAPLUS

DOCUMENT NUMBER: 120:110949

TITLE: Manufacture of oxidized graphite by
 reaction with salts and washing

INVENTOR(S): Saldin, Vitalij I.; Tsvetnikov, Aleksandr K.;
 Volkov, Dmitrij A.; Kukhlevskaya, Tamila S.

PATENT ASSIGNEE(S): Institute of Chemistry, Vladivostok, USSR

SOURCE: U.S.S.R. From: Izobreteniya 1993, (8), 80.

CODEN: URXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Russian

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
SU 1798302	A1	19930228	SU 1990-4907357	199012 24

PRIORITY APPLN. INFO.:

SU 1990-4907357

199012

24

<--

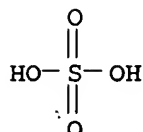
AB Natural flake graphite is oxidized with NaNO_3 - and KMnO_4 -containing concentrated H_2SO_4 , washed with water to pH 1.0, and then with a coagulating solution. Manufacturing costs are decreased and safety is improved when the coagulating solution is 3.0-5.0-weight% aqueous $(\text{NH}_4)_2\text{CO}_3$ or NH_4HCO_3 , at at 18.0-40.0 weight parts/weight part initial graphite. The washing with NH_4 salt solution is preferably carried out in 3-4 stages.

IT 7664-93-9, Sulfuric acid, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(oxidizing salt containing, oxidation with, of natural graphite flakes, washing with ammonium salts in, for safety)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)

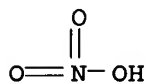


IT 7631-99-4, Sodium nitrate, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(sulfuric acid containing, oxidation with, of natural graphite flakes, washing with ammonium salts in, for safety)

RN 7631-99-4 HCAPLUS

CN Nitric acid sodium salt (1:1) (CA INDEX NAME)



● Na

IC ICM C01B031-00

CC 49-8 (Industrial Inorganic Chemicals)

ST safety graphite flake oxidn washing; sulfuric acid graphite flake oxidn; sodium nitrate sulfuric acid; potassium permanganate sulfuric acid; ammonium carbonate graphite washing

IT Safety

(in graphite oxidation with oxidizing salt-containing concentrated sulfuric acid, by washing with ammonium salts)

IT 7782-42-5, Graphite, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(flakes, oxidation of, by oxidizing salt-containing concentrated sulfuric acid, washing with ammonium salts in, for safety)

IT 7664-93-9, Sulfuric acid, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(oxidizing salt containing, oxidation with, of natural
graphite flakes, washing with ammonium salts in, for
safety)

IT 7722-64-7, Potassium permanganate

RL: USES (Uses)

(sulfuric acid containing, oxidation with, of natural graphite flakes,
washing with ammonium salts in, for safety)

IT 7631-99-4, Sodium nitrate, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(sulfuric acid containing, oxidation with, of natural graphite flakes,
washing with ammonium salts in, for safety)

IT 506-87-6, Diammonium carbonate 1066-33-7, Ammonium hydrogen
carbonate

RL: USES (Uses)

(washing with, of graphite oxidized with
oxidizing salt-containing concentrated sulfuric acid, for safety)

L70 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1992:576834 HCAPLUS

DOCUMENT NUMBER: 117:176834

TITLE: Thermal stability of pyrolytic graphite
electrochemically modified in a sulfuric acid
solution

AUTHOR(S): Neffe, Slawomir; Badowski, Mirosław;
Burakiewicz-Mortka, Wanda

CORPORATE SOURCE: Wojskowa Akad. Tech. im. J. Dabrowskiego,
Warsaw, Pol.

SOURCE: Przegląd Chemiczny (1992), 71(8),
313-16

CODEN: PRCHAB; ISSN: 0033-2496

DOCUMENT TYPE: Journal

LANGUAGE: Polish

AB Two types of pyrolytic graphite were subjected to long-term anodic
polarization in a 1M H₂SO₄ solution, and the obtained product was
examined by thermal anal., IR absorption spectroscopy, and elemental
anal. The surface morphol. of the modified graphite was analyzed by
SEM. The result of the anodic oxidation was an intercalated graphite
containing ≤28 weight% O undergoing thermal decomposition at
160-190°. Besides O, between the C layers, the graphite also
contained a significant amount of carbonyl, Ph, carboxyl,
and epoxy functional groups on its surface, and these groups did not
decompose at <200°. The oxidized pyrolytic graphite
is of interest as an electrode material.

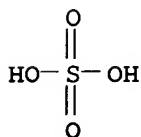
IT 7664-93-9, Sulfuric acid, uses

RL: USES (Uses)

(anodic polarization by aqueous, of pyrolytic graphite, for
intercalation compds.)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 57-8 (Ceramics)

Section cross-reference(s): 49, 72

ST **graphite** modification **sulfuric acid**
thermal stability; anodic polarization pyrolytic graphite surface
morphol

IT Carbonyl group
Carboxyl group
Epoxy group
Phenyl group
(graphite intercalation compds. containing, from anodic polarization
of pyrolytic **graphite** in **sulfuric**
acid solution, thermal stability of)

IT 7664-93-9, Sulfuric acid, uses
RL: USES (Uses)
(anodic polarization by **aqueous**, of pyrolytic graphite, for
intercalation compds.)

IT 7782-44-7, Oxygen, occurrence
RL: OCCU (Occurrence)
(graphite intercalation compds. containing, from anodic polarization
of pyrolytic **graphite** in **sulfuric**
acid solution, thermal stability of)

IT 7782-42-5D, Graphite, intercalation compds.
RL: PRP (Properties)
(stability of, derived from anodic polarization of pyrolytic
graphite in **sulfuric acid** solution)

L70 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1990:636610 HCAPLUS

DOCUMENT NUMBER: 113:236610

TITLE: Thermally expandable graphite having long-term
stability, and its manufacture

INVENTOR(S): Suzuki, Takeshi; Sakagami, Haruo; Ihata,
Satoshi; Takagi, Tsutomu

PATENT ASSIGNEE(S): Nippon Kasei K. K., Fukushima, Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 13 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 02153811	A	19900613	JP 1988-306802	198812 06

<--

PRIORITY APPLN. INFO.: JP 1988-306802

198812
06

<--

AB The graphite, capable of forming inclusion compds. with H₂SO₄,
contains ≥1 mols (vs. H₂SO₄ other than H₂SO₄) alkali metals.
The graphite is prepared by treating **graphite** with concentrated
H₂SO₄ and an **oxidizing agent**, **washing**
the material with **water** to free-H₂SO₄ concentration ≤1
mol/kg (vs. solid to be **washed**), neutralizing the material
with **aqueous** alkali metal compound solution to alkali metal concentration
≥2 mols (vs. free H₂SO₄), and drying the material. Acrylic
paints containing the graphite had long-term stability and corrosion

resistance.
 IC ICM C01B031-04
 ICS C09C001-46
 CC 57-8 (Ceramics)
 Section cross-reference(s): 42
 ST **graphite sulfuric acid** inclusion
 compd; coating paint expandable graphite
 IT Alkali metals, compounds
 RL: USES (Uses)
 (graphite-sulfuric acid inclusion
 compds. containing, for stability)
 IT 7440-09-7, Potassium, uses and miscellaneous 7440-23-5, Sodium,
 uses and miscellaneous
 RL: USES (Uses)
 (graphite-sulfuric acid inclusion
 compds. containing, for stability)
 IT 7782-42-5, **Graphite-sulfuric acid**
 inclusion compound, uses and miscellaneous
 RL: USES (Uses)
 (thermally expandable, alkali metal-containing, pH
 -controlled)

L70 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1985:564198 HCAPLUS
 DOCUMENT NUMBER: 103:164198
 TITLE: Recovery of valuable materials from spent
 manganese dioxide dry batteries
 PATENT ASSIGNEE(S): Japan Metals and Chemicals Co., Ltd., Japan;
 Nichiju Research Center K. K.
 SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 60096734	A	19850530	JP 1983-205258	198311 01
			<--	
JP 03061730	B	19910920		
PRIORITY APPLN. INFO.:			JP 1983-205258	198311 01

AB Scrap batteries are processed for the recovery of Zn, Fe, and graphite. Thus, 20 spent dry batteries containing Zn 520, Mn 253, Fe 360, and graphite 106 g were crushed to destroy airtightness, and heated in a SiO₂ crucible at 500° (400-600°) for 3 h in a 20-kVA high-frequency furnace of condenser type. The Zn-rich condensed metal was dissolved in HCl, adjusted to pH 1-2 with NH₄OH, and passed through a Hg(II)-absorption resin column. The effluent was adjusted to pH 7, passed through a chelate resin column to recover Cd, Zn, and Pb, and concentrated to obtain aqueous NH₄Cl. Molten metal was separated from the solids in the crucible, dissolved in dilute HCl, mixed with aqueous H₂O₂, filtered from the precipitate containing Fe and Mn, stirred with

Zn dust, filtered from a precipitate containing Pb and Cd, and concentrated to obtain

aqueous 50% ZnCl₂ with 85.6% Zn yield. The solids and Fe-rich precipitate were mixed, heated again at 1000° (700-1100°) for 3 h, and Zn vapor was condensed for use as Zn dust. The residue was separated magnetically to recover 98% Fe. The nonmagnetic portion was stirred in dilute H₂SO₄, filtered from graphite (91% yield), neutralized with Ca(OH)₂, and filtered to obtain aqueous MnSO₄ (92.2% yield).

IC ICM C22B007-00

ICS C01G009-04; C01G045-10; C22B017-00; C22B019-30; C22B047-00

CC 54-2 (Extractive Metallurgy)

Section cross-reference(s): 52

L70 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1984:457212 HCAPLUS

DOCUMENT NUMBER: 101:57212

TITLE: Purifying graphite

INVENTOR(S): Atkinson, Alan William; Lancaster, Janet Margaret

PATENT ASSIGNEE(S): T and N Materials Research Ltd., UK

SOURCE: Brit. UK Pat. Appl., 3 pp.

CODEN: BAXXDU

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
GB 2128971	A	19840510	GB 1982-28667	19821007
GB 2128971	B	19851120	GB 1982-28667	19821007

AB The graphite compound obtained by treating graphite with H₂SO₄ under oxidizing conditions and washing with water to remove free H₂SO₄ is washed further with water at >100° and >1 atm or with HNO₃ or a NO₃--containing solution to remove HSO₄-. Thus, a graphite bisulfate which gave a leach solution of pH 3.5 after exfoliation was treated in an autoclave with water at 120° for 1 h. After being exfoliated the product gave a leach solution with a pH of 6.4.

IT 12777-87-6P

RL: PUR (Purification or recovery); PREP (Preparation) (purification of, with superheated water, for bisulfate removal)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

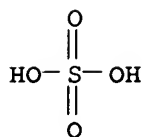
CCI MNS

C

CM 2

CRN 7664-93-9

CMF H2 04 S



IC C01B031-04

CC 49-1 (Industrial Inorganic Chemicals)

IT 12777-87-6P

RL: PUR (Purification or recovery); PREP (Preparation)
(purification of, with superheated water, for bisulfate
removal)

L70 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1980:557652 HCAPLUS

DOCUMENT NUMBER: 93:157652

TITLE: Electrochemical oxidation of papaverine

AUTHOR(S): Prikhod'ko, N. A.; Zhurinov, M. Zh.; Fioshin, M. Ya.

CORPORATE SOURCE: Kaz. Khim.-Tekhnol. Inst., Chimkent, USSR

SOURCE: Elektrokimiya (1980), 16(8), 1278-9

CODEN: ELKKAX; ISSN: 0424-8570

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB Papaverine (I) [58-74-2], oxidized on a graphite
microelectrode, in aqueous H₂SO₄ at 20-25°

and 3.0 < pH < 7.0, forms 1 totally irreversible oxidation
wave, the height of which corresponds to a 2-3-electron level
(depending on the conditions of plotting the current-potential
curves). In contrast to other derivs. of benzyltetrahydroquinoline,
I under definite conditions can be oxidized electrochem.
without breaking the bond between the N-containing and the non N-containing
parts of the mol. A mechanism of the process is presented.

CC 72-1 (Electrochemistry)

Section cross-reference(s): 26

=> d l71 ibib abs hitstr hitind 1-8

L71 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2000:635281 HCAPLUS

DOCUMENT NUMBER: 133:298352

TITLE: Investigation on synthesis of low-sulfur GIC in
H₂O₂-H₂SO₄ solution

AUTHOR(S): Yang, Dong-Xiong; Kang, Fei-Yu; Zheng, Yong-Ping

CORPORATE SOURCE: Department of Materials Science and Engineering,

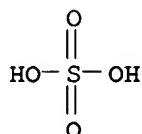
Tsinghua University, Beijing, 100084, Peop. Rep.
China

SOURCE: Tansu Jishu (2000), (2), 6-10
CODEN: TAJIFD; ISSN: 1001-3741
PUBLISHER: Tansu Jishu Bianjibu
DOCUMENT TYPE: Journal
LANGUAGE: Chinese

AB **H2SO4-GIC** (graphite intercalation compound) was chemical synthesized in the concentrated sulfuric acid, in which **hydrogen peroxide** acted as oxidant. The present work studies the factors that influence the residual sulfur content and exfoliated volume, such as **hydrogen peroxide** concentration, the ratio of **hydrogen peroxide** and concentrated sulfuric acid, the pH value of the rinsing liquid, drying temperature and exfoliated temperature. The rational parameters for synthesizing low-sulfur GIC are obtained, and the intercalation mechanism is also discussed.

IT 7664-93-9, Sulfuric acid, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(synthesis of low-sulfur graphite intercalation compds. in **hydrogen peroxide-sulfuric acid** solution)

RN 7664-93-9 HCAPLUS
CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 49-7 (Industrial Inorganic Chemicals)

IT Intercalation compounds
RL: SPN (Synthetic preparation); PREP (Preparation)
(synthesis of low-sulfur graphite intercalation compds. in **hydrogen peroxide-sulfuric acid** solution)

IT 7704-34-9, Sulfur, properties
RL: PRP (Properties)
(synthesis of low-sulfur graphite intercalation compds. in **hydrogen peroxide-sulfuric acid** solution)

IT 7664-93-9, Sulfuric acid, reactions 7722-84-1, **Hydrogen peroxide**, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(synthesis of low-sulfur graphite intercalation compds. in **hydrogen peroxide-sulfuric acid** solution)

IT 7782-42-5P, Graphite, preparation
RL: SPN (Synthetic preparation); PREP (Preparation)
(synthesis of low-sulfur graphite intercalation compds. in **hydrogen peroxide-sulfuric acid** solution)

L71 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:673823 HCAPLUS

DOCUMENT NUMBER: 131:304501

TITLE: Atomic force microscopy imaging of molybdenum
oxide film electrodeposited on a carbon
electrode

AUTHOR(S): Liu, Shaoqin; Zhang, Qibin; Wang, Erkang; Dong,
Shaojun

CORPORATE SOURCE: Laboratory of Electroanalytical Chemistry and

SOURCE: National Analysis and Research Center of
Electrochemistry and Spectroscopy, Changchun
Institute of Applied Chemistry, Chinese Academy
of Sciences, Changchun, 130022, Peop. Rep. China
Electrochemistry Communications (1999
) , 1(9), 365-369
CODEN: ECCMF9; ISSN: 1388-2481

PUBLISHER: Elsevier Science B.V.

DOCUMENT TYPE: Journal

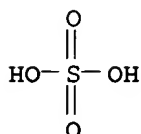
LANGUAGE: English

AB Nonstoichiometric mixed-valent molybdenum(VI,V) oxide film was grown on carbon substrates by the electrodeposition method. Responses of the prepared molybdenum oxide thin films to potential and to different solution acidities were studied by cyclic voltammetry, and the corresponding morphol. changes of the film were monitored by atomic force microscopy (AFM). AFM images of the molybdenum oxide film show that the characteristic domed structure on the film surface increased during the transition from the **oxidized** state to the reduced state without signifcation change in the root-mean-square surface roughness value. Also, AFM studies show that the solution acidity has great effect on the morphol. of the films, and the films undergo a homogenizing process with increasing pH of the solns.

IT 7664-93-9, Sulfuric acid, uses
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)
(electrodeposition of nonstoichiometric mixed-valent molybdenum(VI,V) oxide film on **graphite** electrode in **sulfuric acid** solution containing MoO42-: atomic force microscopy imaging of mixed-valent molybdenum oxide film electrodeposit)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)
Section cross-reference(s): 66

IT Cyclic voltammetry
(of molybdenum oxide film-modified **graphite** electrode in **sulfuric acid** solution)

IT Electrodeposition
(of nonstoichiometric mixed-valent molybdenum(VI,V) oxide film on **graphite** electrode in **sulfuric acid** solution containing MoO42-)

IT 7782-42-5, Graphite, uses
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(electrodeposition of nonstoichiometric mixed-valent molybdenum(VI,V) oxide film on **graphite** electrode in **sulfuric acid** solution containing MoO42-: atomic force microscopy imaging of mixed-valent molybdenum oxide film electrodeposit)

IT 7664-93-9, Sulfuric acid, uses
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)

(electrodeposition of nonstoichiometric mixed-valent molybdenum(VI,V) oxide film on **graphite** electrode in **sulfuric acid** solution containing MoO42-: atomic force microscopy imaging of mixed-valent molybdenum oxide film electrodeposit)

IT 14259-85-9, Molybdate (MoO42-)

RL: PRP (Properties); RCT (Reactant); RACT (Reactant or reagent)
(electrodeposition of nonstoichiometric mixed-valent molybdenum(VI,V) oxide film on **graphite** electrode in **sulfuric acid** solution containing MoO42-: atomic force microscopy imaging of mixed-valent molybdenum oxide film electrodeposit)

REFERENCE COUNT: 32 THERE ARE 32 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L71 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1993:636444 HCAPLUS

DOCUMENT NUMBER: 119:236444

TITLE: Oxidation of ascorbic acid on a polyaniline-modified electrode

AUTHOR(S): Orata, Duke; Segor, Fred

CORPORATE SOURCE: Dep. Chem., Univ. Nairobi, Nairobi, Kenya

SOURCE: Bulletin of the Chemical Society of Ethiopia (1993), 7(1), 53-60

CODEN: BCETE6; ISSN: 1011-3924

DOCUMENT TYPE: Journal

LANGUAGE: English

AB The results presented in this paper reveal marked improvement in the oxidation characteristics of the physiol. active carbohydrate (ascorbic acid), when the latter is **oxidized** on a polyaniline derivatized C graphite working electrode. The pH of the system also influences significantly the role of polyaniline in determining the oxidation characteristics of ascorbic acid. Polyaniline conductivity is also dependent of the temperature

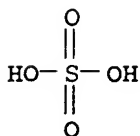
IT 7664-93-9, Sulfuric acid, uses

RL: USES (Uses)

(electropolymer. of aniline in solns. containing, for modified carbon graphite electrodes for ascorbic acid oxidation)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 72-2 (Electrochemistry)

Section cross-reference(s): 22, 36

IT 62-53-3, Aniline, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(electrochem. polymerization of, in **sulfuric acid**, for modifying carbon **graphite** electrodes for ascorbic acid oxidation)

IT 7664-93-9, Sulfuric acid, uses

RL: USES (Uses)

(electropolymer. of aniline in solns. containing, for modified carbon

graphite electrodes for ascorbic acid oxidation)

L71 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1987:168041 HCAPLUS

DOCUMENT NUMBER: 106:168041

TITLE: Chemically modified electrodes. IV.
Polyacrylamidine thiocyanate-modified graphite
electrode and its application to determination
of gold

AUTHOR(S): Su, Zhixing; Li, Hulin; Zhang, Yulin; Li,
Zhenjiang

CORPORATE SOURCE: Chem. Dep., Lanzhou Univ., Lanzhou, Peop. Rep.
China

SOURCE: Fenxi Huaxue (1986), 14(12), 886-90

CODEN: FHHHDT; ISSN: 0253-3820

DOCUMENT TYPE: Journal

LANGUAGE: Chinese

AB The title electrode was prepared by oxidizing a
graphite electrode with $\text{HNO}_3\text{-H}_2\text{SO}_4$ (1:1), coating
the oxidized electrode with polyacrylonitrile, and
subsequently reacting polyacrylonitrile with NH_4SCN at 130° .
 Au^{3+} was preconcd. on the modified electrode by soaking the
electrode in the sample solution for 15 min and determined by cyclic
voltammetry in HOAc-NaOAc buffer solution at pH 3.0 with 0.1M
 KCl as supporting electrolyte. A reduction peak of Au^{3+} was observed at
0.15 V vs. SCE. The peak current was proportional to Au^{3+} concentration in
the range 4.8×10^{-5} - $1.2 \times 10^{-3}\text{M}$. Ag, Ru, Pd, Ir, Pt,
and other transition metals did not interfere.

CC 79-6 (Inorganic Analytical Chemistry)

L71 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1980:9858 HCAPLUS

DOCUMENT NUMBER: 92:9858

TITLE: Etching of copper by graphite
suspension in dilute sulfuric
acid solution

AUTHOR(S): Oki, Takeo; Kunieda, Yoshihiko

CORPORATE SOURCE: Fac. Eng., Nagoya Univ., Nagoya, 464, Japan

SOURCE: Kinzoku Hyomen Gijutsu (1979), 30(10),
525-9

CODEN: KZHGAY; ISSN: 0026-0614

DOCUMENT TYPE: Journal

LANGUAGE: Japanese

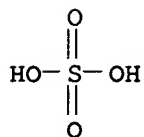
AB Etching of Cu by anodically oxidized graphite
suspension in H_2SO_4 was studied in relation to anode,
suspension, size of graphite particles, temperature, and solution pH.
The anode current-potential relations for Pt, graphite, and
 $\text{PbO}_2(\text{Pb})$ anodes depends only upon the amount of graphite in the solution
for the potential below that of gas evolution. The quantity of
electricity required to oxidize graphite particles per
unit surface area increases with increasing temperature. As graphite
particles are oxidized at the anode, the potential of the
suspension approaches the anode potential. The etching rate of Cu
increases with increasing amount of graphite and with decreasing diameter
of graphite, and also with increasing temperature, and lower pH.
The dissolved Cu is recovered simultaneously as the deposit at the
cathode.

IT 7664-93-9, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(etching of copper by anodized graphite suspension in)

RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 56-5 (Nonferrous Metals and Alloys)
 IT Anodization
 (of **graphite** suspension in **sulfuric acid**, electrolytic etching of copper in relation to)
 IT Etching
 (electrolytic, of copper, by anodized **graphite** suspension in **sulfuric acid**)
 IT 7664-93-9, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (etching of copper by anodized graphite suspension in)
 IT 7440-50-8, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (etching of, electrolytic, by anodized **graphite** suspension in **sulfuric acid**)

L71 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1975:452819 HCAPLUS
 DOCUMENT NUMBER: 83:52819
 TITLE: Reaction of 2,3-quinoxalinedithiol with thallium(III) ions
 AUTHOR(S): Chernomorchenko, L. I.; Akhmetshin, A. G.; Vasilenko, V. D.
 CORPORATE SOURCE: USSR
 SOURCE: Voprosy Khimii i Khimicheskoi Tekhnologii (1974), 33, 81-6
 CODEN: VKKCAJ; ISSN: 0321-4095
 DOCUMENT TYPE: Journal
 LANGUAGE: Russian

AB The action of 2,3-quinoxalinedithiol (I) with Tl(III) was studied by emf and amperometric titration. A yellow precipitate was formed with a I/Tl(III) molar ratio of 0.655-0.28 in 0.1-10.0N H₂SO₄, 1.50 in 0.1N HCl, 0.50 in 0.1N HNO₃, 1.0 in 0.1N HOAc or acetate buffer at pH 4-6. The molar ratio decreased with time but after 1-2 min it reached constant value. The formation of ternary complexes of the type Tl₂(RS₂)₂SO₄ or Tl₂RS₂(SO₄)₂ was suggested; Tl(I) ions were also detected and the disproportionation of the initially formed complexes into Tl(I) and **oxidized** form of the reagent was assumed. Irrespective of the complicated mechanism, 0.03-5.8 mg Tl can be determined by amperometry in 0.1N H₂SO₄ with a **graphite** anode at 0.9 V vs. SCE; up to 0.096 mg Tl can be determined by potentiometry. The amperometric method is preferred. Sn(IV), Sb(III), Cu(II), Co(II), Hg(II), and Fe(III) interfere. The error is ±5% at M/Tl(III) ratios of 200, 2, 5, and 1 for Pb, Bi, Ni, and Ag, resp.
 CC 79-6 (Inorganic Analytical Chemistry)

L71 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1972:424044 HCAPLUS
 DOCUMENT NUMBER: 77:24044

TITLE: Removal of a finely divided coating from a
porcelain surface in Perhydrol production
AUTHOR(S): Khramov, A. V.; Mikhailov, V. A.; Planina, L. S.
CORPORATE SOURCE: USSR
SOURCE: Sin., Ochistka Anal. Neorg. Mater., Tr. Konf.
"Nauka-Proizvod." (1971), Meeting Date
1965, 225-9. Editor(s): Nikolaev, A. V.
"Nauka", Sib. Otd.: Novosibirsk, USSR.
CODEN: 24YLA9

DOCUMENT TYPE: Conference
LANGUAGE: Russian

AB The dark coating deposited on porcelain Raschig rings in the
production of H₂O₂ from H₂SO₄ by electrolysis
contained graphite 28, SiO₂ 36, and M₂O₃ 36% (where M was
sesquioxidic metals). Its dissoln. in 25% NH₄OH, concentrated Trilone B (pH 9) solution, and in NaOH (1-40% solution) at the b.p. of the
solution was studied. The 1st two agents were ineffective and complete
removal of the coating was reached only after boiling in NaOH solns.
at all concns., varying only the time of boiling. Concns.
≤10% of NaOH were suitable; at higher concns., the glazed
surface of the rings was attacked. For industrial purposes, 1%
solution of NaOH and 4 hr boiling was recommended.

CC 57-2 (Ceramics)

Section cross-reference(s): 42, 49

IT 1310-73-2, uses and miscellaneous

RL: USES (Uses)

(in removal of graphite-oxide-silica deposit from porcelain
Raschig rings in hydrogen peroxide manufacture)

L71 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1937:60862 HCAPLUS

DOCUMENT NUMBER: 31:60862

ORIGINAL REFERENCE NO.: 31:8391d-g

TITLE: The energy hump in chemistry. I

AUTHOR(S): Bancroft, Wilder D.; Magoffin, James E.

SOURCE: Journal of the Franklin Institute (1937
, 224, 283-309

CODEN: JFINAB; ISSN: 0016-0032

DOCUMENT TYPE: Journal

LANGUAGE: Unavailable

AB cf. C. A. 31, 1300.5. In a reaction made to take place
electrolytically, the height of the energy hump is defined as the
difference between the free energy of the system and the voltage
energy necessary to produce the reaction. The energy hump decreases
with increasing concentration or temperature as in the case of H₂SO₄. The energy
bump may be eliminated by a suitable catalytic agent as in the case
of Pt and mol. H. A one-way electrode such as the cysteine-cystine
case gives an e. m. f. which is a function of the concentration of cysteine
only if pH and temperature are constant. If an electron transfer
between an inert metal and an oxidizable or reducible
substance involves an energy hump, no reduction or oxidation will
take place. The energy hump for the sulfate-sulfite reaction is
about 2 v.; for the nitrate-nitrite reaction about 0.66 v. at a Pt
cathode, 0.7 v. at an Fe cathode, 0.9 v. at a Zn cathode and 1.1 v.
at a Hg cathode. If the e. m. f. of a CrCl₂ solution is higher than
the overvoltage of H at the immersed metal, the CrCl₂ will be
oxidized until equilibrium is reached. The fact that a CrCl₂
solution decomps. slowly or not at all in the absence of a metal proves
that there is an overvoltage for H in the absence of a metal. The
reduction of dimethylacrylic acid by Pt and H but not by CrCl₂ solution

is due to activation of the dimethylacrylic acid by the Pt.
 CC 4 (Electrochemistry)
 IT Oxidation
 (electrochem., of Ceylon graphite in H2SO4
 solns., effect of Pt on)
 IT 7440-06-4, Platinum
 (effect on electrochem. oxidation of Ceylon graphite in
 H2SO4 solns.)

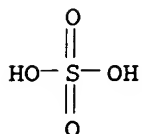
=> d 172 ibib abs hitstr hitind 1-11

L72 ANSWER 1 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 2001:563778 HCAPLUS
 DOCUMENT NUMBER: 135:139356
 TITLE: Preparation of polyphosphoric acid-containing
 expanded graphite intercalation compounds as
 sealing and packing materials
 INVENTOR(S): Ottinger, Oswin; Malik, Hubert
 PATENT ASSIGNEE(S): SGL Carbon A.-G., Germany
 SOURCE: Eur. Pat. Appl., 16 pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: German
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
EP 1120378	A2	20010801	EP 2001-100048	20010109
<--				
EP 1120378	A3	20010905		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC,				
PT, IE, SI, LT, LV, FI, RO				
DE 10003927	A1	20010802	DE 2000-10003927	20000129
<--				
JP 2001247302	A	20010911	JP 2001-14289	20010123
<--				
US 2001018040	A1	20010830	US 2001-770716	20010125
<--				
US 6645456	B2	20031111		
CA 2332756	A1	20010729	CA 2001-2332756	20010126
<--				
PRIORITY APPLN. INFO.:			DE 2000-10003927 A	20000129
<--				
AB	Expanded graphite intercalation compds. are prepared from thermal polyphosphoric acid, which is added as a solution with a addnl.			

intercalating components to crystalline layered graphite particles. The solution containing the intercalating materials (which included a strong concentrated acid and an oxidizing agent, in the absence of added water) is then reacted with the graphite at from -10° to 80°; following intercalation, the composition is then rapidly heated to 500-800° and expanded. The oxidizing agents are selected from red fuming nitric acid, hydrogen peroxide, and peroxosulfuric acid. The products can be processed to form lightwt. materials, with bulk d. ≤3 g/L, that have use as graphite foils, laminates, sealing materials, packing materials (e.g., rings and fabric).

IT 7664-93-9P, Sulfuric acid, preparation
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (concentrated, expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-00
 ICS C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 47
 ST intercalation expanded graphite polyphosphoric acid; nitric acid expanded graphite polyphosphoric acid; oxidizer expanded graphite polyphosphoric acid; sealing material expanded graphite
 IT Cellular materials
 Oxidizing agents
 (preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 IT 7664-93-9P, Sulfuric acid, preparation
 7697-37-2P, Nitric acid, preparation
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (concentrated, expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 IT 7722-84-1P, Hydrogen peroxide, preparation
 13445-49-3P, Peroxodisulfuric acid
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)

L72 ANSWER 2 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2000:301536 HCAPLUS

DOCUMENT NUMBER: 133:6511

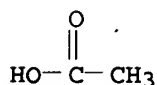
TITLE: Decreasing of S content in expanded graphite by immersion-replacement and intercalation of organic reagent

AUTHOR(S): Dun, Huijuan; Song, Kemin; Zhao, Aidong
 CORPORATE SOURCE: Test Center, Hebei Normal University,
 Shijiazhuang, 050016, Peop. Rep. China
 SOURCE: Feijinshukuang (2000), 23(2), 13-14
 CODEN: FEIJDJ; ISSN: 0253-2298
 PUBLISHER: Feijinshukuang Bianjibu
 DOCUMENT TYPE: Journal
 LANGUAGE: Chinese

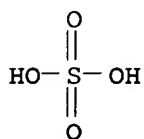
AB Expanded graphite was prepared from **graphite**, **H2SO4**, **KMnO4**, and acetic acid or acetic anhydride; the weight ratio of **graphite:acetic acid:H2SO4:KMnO4** was 1.0:2.0:0.5:0.07, and that of **graphite:acetic anhydride:H2SO4:KMnO4** was 1.0:1.0:0.12:0.06. S content decreased by 68-70% compared with conventional method. Expanded graphite was also prepared by allowing a mixture of **graphite**, **H2SO4**, and **H2O2** (or **(NH4)2S2O8**) to react, filtering, dipping in **HNO3-oxalic acid** system, filtering, washing, and drying at 60°. The weight ratio of **graphite:H2SO4:H2O2** was 1.0:4.0:0.1, that of **graphite:H2SO4:(NH4)2S2O8** was 1.0:4.0:0.15, and oxalic acid content in the **HNO3-oxalic acid** system was 7.5%. S content decreased by 79-87% compared with conventional method.

IT 64-19-7, Acetic acid, reactions 7664-93-9, Sulfuric acid, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of expanded **graphite** from **graphite** and **sulfuric acid** and potassium permanganate and acetic acid or acetic anhydride)

RN 64-19-7 HCAPLUS
 CN Acetic acid (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 49-4 (Industrial Inorganic Chemicals)
 IT 7782-42-5P, Graphite, preparation
 RL: IMF (Industrial manufacture); PREP (Preparation)
 (expanded; preparation of expanded **graphite** from **graphite** and **sulfuric acid** and potassium permanganate and acetic acid or acetic anhydride)

IT 7727-54-0, Ammonium peroxydisulfate
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of expanded **graphite** from **graphite** and **sulfuric acid** and ammonium peroxydisulfate in nitric acid-oxalic acid system)

IT 7722-84-1, Hydrogen peroxide, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of expanded graphite from graphite
 and sulfuric acid and hydrogen
 peroxide in nitric acid-oxalic acid system)

IT 144-62-7, Oxalic acid, reactions 7697-37-2, Nitric acid, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of expanded graphite from graphite
 and sulfuric acid and hydrogen
 peroxide or ammonium peroxydisulfate in nitric
 acid-oxalic acid system)

IT 64-19-7, Acetic acid, reactions 108-24-7, Acetic anhydride

7664-93-9, Sulfuric acid, reactions 7722-64-7, Potassium
 permanganate

RL: RCT (Reactant); RACT (Reactant or reagent)
 (preparation of expanded graphite from graphite
 and sulfuric acid and potassium permanganate
 and acetic acid or acetic anhydride)

L72 ANSWER 3 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1999:633465 HCAPLUS

DOCUMENT NUMBER: 131:259528

TITLE: Manufacture of thermal expansible graphite

INVENTOR(S): Miyamoto, Norimitsu; Iwamoto, Kenjiro; Oka,
 Mikio

PATENT ASSIGNEE(S): Sumikin Kako Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 11268908	A	19991005	JP 1998-92761	199803 19

<--

PRIORITY APPLN. INFO.: JP 1998-92761

199803
19

<--

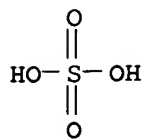
AB The title process comprises treating graphite with concentrated
 H₂SO₄ containing (NH₄)₂S₂O₈ and H₂O₂, immersing in
 aqueous urea after washing with water,
 neutralizing, and filtering, and then drying the graphite. The
 thermal expansible graphite is useful for fireproofing agents for
 polymers such as polyurethane.

IT 7664-93-9, Sulfuric acid, uses

RL: NUU (Other use, unclassified); USES (Uses)
 (treating by H₂SO₄ containing (NH₄)₂S₂O₈ and H₂O₂ and
 immersing in aqueous urea in manufacture of thermal expansible
 graphite for fireproofing agent)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 37
 ST graphite thermal expansible fireproofing agent; ammonium peroxydisulfate urea graphite treatment; **hydrogen peroxide** urea graphite treatment
 IT Fireproofing agents
 (treating by H2SO4 containing (NH4)2S2O8 and H2O2 and immersing in **aqueous** urea in manufacture of thermal expansible graphite for fireproofing agent)
 IT 57-13-6, Urea, uses 7664-93-9, Sulfuric acid, uses 7722-84-1; **Hydrogen peroxide**, uses 7727-54-0, Ammonium peroxydisulfate
 RL: NUU (Other use, unclassified); USES (Uses)
 (treating by H2SO4 containing (NH4)2S2O8 and H2O2 and immersing in **aqueous** urea in manufacture of thermal expansible graphite for fireproofing agent)
 IT 7782-42-5; **Graphite**, properties
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
 (treating by **H2SO4** containing (NH4)2S2O8 and **H2O2** and immersing in **aqueous** urea in manufacture of thermal expansible graphite for fireproofing agent)

L72 ANSWER 4 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1995:780686 HCAPLUS
 DOCUMENT NUMBER: 123:174314
 TITLE: Manufacture of acid-treated graphite for making expanded graphite
 INVENTOR(S): Ishikawa, Kojiro; Doi, Tei; Yamamoto, Toshihide; Sugimoto, Hisanori
 PATENT ASSIGNEE(S): Nippon Kokuen Kogyo Kk, Japan; Nippon Graphite Industries, Ltd.
 SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07157303	A	19950620	JP 1993-302856	19931202
JP 3540348	B2	20040707	JP 1993-302856	19931202

PRIORITY APPLN. INFO.: <--

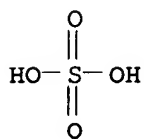
<--

AB The manufacture comprises adding $\geq 90\%$ concentration H_2SO_4 into graphite particles and stirring to give pastes, cooling to $\leq 10^\circ$, and adding aqueous H_2O_2 with temperature $\leq 10^\circ$ into the pastes by stirring to oxidize the graphite powders. The graphite may be scaly graphite, thermally decomposed graphite, and/or kitsch graphite. The manufacture of expanded graphite comprises heating the acid-treated graphite at $\geq 700^\circ$.

IT 7664-93-9, Sulfuric acid, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (acid treatment of graphite and manufacture of expanded graphite)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-04
 ICS C09C001-46

CC 49-1 (Industrial Inorganic Chemicals)

IT 7664-93-9, Sulfuric acid, processes 7722-84-1,
 Hydrogen peroxide, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (acid treatment of graphite and manufacture of expanded graphite)

L72 ANSWER 5 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1993:583977 HCAPLUS

DOCUMENT NUMBER: 119:183977

TITLE: Manufacture of expanded carbon

INVENTOR(S): Kral, Pavel; Troller, Pavel; Tacl, Alexandr;
 Kriz, Vaclav; David, Jiri

PATENT ASSIGNEE(S): Rudne Doly Pribram S. P., Czech.

SOURCE: Czech., 4 pp.
 CODEN: CZXXA9

DOCUMENT TYPE: Patent

LANGUAGE: Czech

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
CS 275568	B2	19920219	CS 1989-6508	198911 17

<--

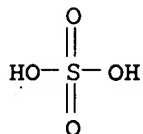
PRIORITY APPLN. INFO.: CS 1989-6508

198911
17

<--

AB The process comprises leaching C particles, preferably natural graphite, with a mixture containing H_2SO_4 or oleum, H_2O_2 , and H_3BO_3 or its salt, washing the leached particles with water, drying, and thermal expansion.

IT 7664-93-9, Sulfuric acid, uses
 RL: USES (Uses)
 (leaching with mixture containing, of natural graphite, in expanded carbon manufacture)
 RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-02
 CC 49-1 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 57
 ST carbon expanded manuf; graphite natural leaching expanded carbon; hydrogen peroxide leaching graphite expanded carbon; sulfuric acid leaching graphite expanded carbon; oleum leaching graphite expanded carbon; boric acid leaching graphite expanded carbon
 IT 1330-43-4, Sodium tetraborate 7664-93-9, Sulfuric acid, uses 7722-84-1, Hydrogen peroxide, uses 8014-95-7, Oleum 10043-35-3, Boric acid, uses
 RL: USES (Uses)
 (leaching with mixture containing, of natural graphite, in expanded carbon manufacture)
 IT 7440-44-0P, Carbon, preparation 7782-42-5P, Graphite, preparation
 RL: PREP (Preparation)
 (manufacture of expanded, by leaching natural graphite with mixture containing hydrogen peroxide and sulfuric acid and boric acid or borate salt)

L72 ANSWER 6 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1991:474592 HCAPLUS
 DOCUMENT NUMBER: 115:74592
 TITLE: Expanded graphite and its preparation and use in removing oil from water
 INVENTOR(S): Maryasin, Ilya; Shelef, Gedaliah; Sandbank, Enrico
 PATENT ASSIGNEE(S): Technion Research and Development Foundation Ltd., Israel
 SOURCE: Eur. Pat. Appl., 4 pp.
 CODEN: EPXXDW
 DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
EP 435766	A2	19910703	EP 1990-403756	199012 24
EP 435766	A3	19920102		
R: BE, DE, DK, FR, GB, IT, NL				

<--

CA 2032965 A1 19910626 CA 1990-2032965

199012
21

AU 9068463 A 19910627 AU 1990-68463

199012
24

JP 04219307 A 19920810 JP 1990-418190

199012
25

PRIORITY APPLN. INFO.:

IL 1989-92872

A

198912
25

AB Expanded graphite having hydrophobic and lyophobic particular vermicular structure has sp. d. 0.003-0.1 g/mL, surface area 50-200 m²/g, and closed pores 3-20% and is used for absorbing large amts. of petroleum products, mineral oils, and vegetable oils from water. The graphite can be in the form of particulate, pillows, blankets, boom, or as a filter medium. The oil absorbed onto the expanded graphite can be released either by pressure or recovered by solvent extraction. The expanded graphite is prepared by treating graphite with a concentrated oxidizing agent (Na dichromate) solution in H₂SO₄ and subsequently heating at >800°.

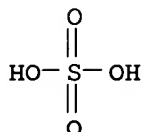
IT 7664-93-9, Sulfuric acid, uses and miscellaneous

RL: USES (Uses)

(in expanded graphite manufacture)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-00

ICS B01J020-00; C02F001-28; C09K003-32; B01D017-022; C11B003-10

CC 49-1 (Industrial Inorganic Chemicals)

ST graphite expanded vermicular structure manuf; petroleum product absorption expanded graphite; mineral oil absorption expanded graphite; vegetable oil absorption expanded graphite; sodium dichromate expanded graphite manuf; sulfuric acid expanded graphite manuf

IT Petroleum products

Hydrocarbon oils

Olive oil

RL: USES (Uses)

(absorption of, from water, expanded graphite with hydrophobic and lyophobic vermicular structure for)

IT Oils, glyceridic

RL: USES (Uses)

(vegetable, absorption of, from water, expanded graphite with hydrophobic and lyophobic vermicular structure for)

IT 7782-42-5P, Graphite, preparation

RL: PREP (Preparation)

(expanded, with hydrophobic and lyophobic vermicular structure,
for absorbing petroleum products and oils from water)

IT 7664-93-9, Sulfuric acid, uses and miscellaneous

RL: USES (Uses)

(in expanded graphite manufacture)

IT 10588-01-9

RL: USES (Uses)

(oxidizing agent, in expanded graphite manufacture)

L72 ANSWER 7 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1990:481493 HCAPLUS

DOCUMENT NUMBER: 113:81493

TITLE: Derivatographic analysis of oxidized
and expanded graphite

AUTHOR(S): Makhorin, K. E.; Zayats, N. N.; Donchak, S. S.;
Sidorenko, A. S.; Pishchai, I. Ya.

CORPORATE SOURCE: Inst. Kolloidn. Khim. Khim. Vody, Kiev, USSR

SOURCE: Khimicheskaya Tekhnologiya (Kiev) (1990
, (3), 44-7

CODEN: KHMTA6; ISSN: 0368-556X

DOCUMENT TYPE: Journal

LANGUAGE: Russian

AB The weight loss vs. temperature curves were analyzed for oxidized
and expanded graphite obtained by impregnating brand GSM-1
graphite with H₂SO₄+H₂O₂ or
H₂SO₄+K₂Cr₂O₇+H₂O+oleum solns. The data are used for the
development of a low-waste technol. of the production of flexible strips
from expanded graphite.

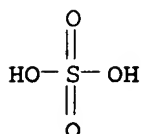
IT 7664-93-9, Sulfuric acid, uses and miscellaneous

RL: USES (Uses)

(impregnation by, in expanded graphite preparation for flexible
strips)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 49-1 (Industrial Inorganic Chemicals)

ST graphite impregnation sulfuric acid
hydrogen peroxide; expanded graphite rolling strip

IT 7722-84-1, Hydrogen peroxide, uses and
miscellaneous 7778-50-9, Dipotassium bichromate (K₂Cr₂O₇)
8014-95-7, Oleum

RL: USES (Uses)

(impregnation by sulfuric acid mixts. with, in expanded graphite
preparation for flexible strips)

IT 7664-93-9, Sulfuric acid, uses and miscellaneous

RL: USES (Uses)

(impregnation by, in expanded graphite preparation for flexible
strips)

L72 ANSWER 8 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1986:499925 HCAPLUS

DOCUMENT NUMBER: 105:99925

TITLE: Intercalation graphite compound
 INVENTOR(S): Yamada, Kazuo; Fujita, Atsushi; Fujii, Yoshikatsu
 PATENT ASSIGNEE(S): Hitachi Chemical Co., Ltd., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 61086412	A	19860501	JP 1984-208596	19841004
JP 04058407	B	19920917	<--	
CN 85107225	A	19860310	CN 1985-107225	19850928
CN 1003928	B	19890419	<--	
PRIORITY APPLN. INFO.:			JP 1984-208596	A 19841004

AB A graphite slurry in H₂SO₄ is mixed at ≤5° with aqueous 20-30% H₂O₂. The process is safe. Thus, 100 g Madagascar graphite (fixed C 97, ash 1, and moisture and volatile matter 2%) in 800 mL com. H₂SO₄ at -2° was mixed with 40 g aqueous 25% H₂O₂, aged for 1 h, filtered, washed, and dried at ≤110°. The weight loss was 23.8% after heating at 400° for 1 h, vs. 6.3 when mixed at 15° with 25 g aqueous 40% H₂O₂ (with effervescence).

IT 12777-87-6P

RL: PREP (Preparation)

(preparation of, by reaction of graphite with sulfuric acid and hydrogen peroxide)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

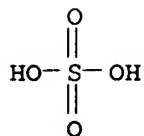
CCI MNS

C

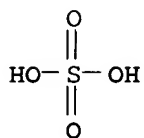
CM 2

CRN 7664-93-9

CMF H2 O4 S



IT 7664-93-9, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction of, with graphite in presence of **hydrogen peroxide**, for intercalation compound)
 RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)
 IT 7722-84-1, uses and miscellaneous
 RL: USES (Uses)
 (in **graphite** reaction with **sulfuric acid**, for intercalation compound)
 IT 12777-87-6P
 RL: PREP (Preparation)
 (preparation of, by reaction of **graphite** with **sulfuric acid** and **hydrogen peroxide**)
 IT 7664-93-9, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction of, with graphite in presence of **hydrogen peroxide**, for intercalation compound)

L72 ANSWER 9 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN
 ACCESSION NUMBER: 1982:201940 HCAPLUS
 DOCUMENT NUMBER: 96:201940
 TITLE: Graphite with vermicular properties
 INVENTOR(S): Wajszel, Dominik
 PATENT ASSIGNEE(S): Akademia Gorniczo-Hutnicza, Pol.
 SOURCE: Pol., 2 pp.
 CODEN: POXXA7
 DOCUMENT TYPE: Patent
 LANGUAGE: Polish
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
PL 108980	B2	19800531	PL 1977-202415	197711 24

<--

PRIORITY APPLN. INFO.:

PL 1977-202415

A

197711

24

<--

AB Graphite, saturated with H₂O and subjected to the action of oxidizing agents, is stirred and reacted with waste acids from the cold decomposition of chloral hydrate or from the production of DDT containing H₂SO₄. The preferred H₂SO₄:H₂O weight ratio is 85:15. A graphite sulfate is formed in contact with air, O₂, O₃, or an oxidizing agent. The graphite with vermicular properties is suitable for preparation of lubricants and foundry molding mixts. Thus, a mixture of graphite containing 12% ash 1 ton, waste acid from production of DDT 6 tons, and water 0.5 m³ was aerated in a 10 m³ reactor for 1 day at ≤80°. Then, the mixture was discharged into a water-containing vessel, decanted several times, filtered, and dried at ≤120°. Vermicular graphite 850 kg was obtained.

IT 12777-87-6P

RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);
RACT (Reactant or reagent)
(preparation and decomposition of, in vermicular graphite manufacture)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

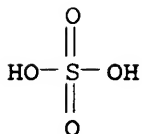
CCI MNS

C

CM 2

CRN 7664-93-9

CMF H2 O4 S

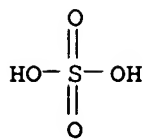


IT 7664-93-9, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(reaction of, with graphite in vermicular graphite manufacture)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)
 Section cross-reference(s): 51, 55, 56
 ST graphite vermicular manuf; sulfuric acid
 reaction graphite
 IT 12777-87-6P
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation);
 RACT (Reactant or reagent)
 (preparation and decomposition of, in vermicular graphite manufacture)
 IT 7664-93-9, reactions
 RL: RCT (Reactant); RACT (Reactant or reagent)
 (reaction of, with graphite in vermicular graphite manufacture)

L72 ANSWER 10 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1979:595267 HCAPLUS
 DOCUMENT NUMBER: 91:195267
 TITLE: Foam graphite
 INVENTOR(S): Nakaoji, Kozo
 PATENT ASSIGNEE(S): Daiwa Kasei K. K., Japan
 SOURCE: Jpn. Kokai Tokkyo Koho, 6 pp.
 CODEN: JKXXAF
 DOCUMENT TYPE: Patent
 LANGUAGE: Japanese
 FAMILY ACC. NUM. COUNT: 1
 PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	
JP 54092589	A	19790721	JP 1977-158960	197712 29

PRIORITY APPLN. INFO.:

<--

JP 1977-158960 A 197712
29

AB Graphite is treated with dichromic acid and H₂SO₄ to give foam graphite. The waste solution is electrolytically oxidized to regenerate dichromic acid and H₂SO₄, which are recycled for treatment of more graphite. Thus, 250 g of graphite was mixed with a solution of 500 mL 60% H₂SO₄ containing 16 g CrO₃ at ambient temperature for 16 h, the mixture was diluted with 400 mL H₂O, filtered, and dried to form 260 g graphite which when heated to 1000° formed a foam.

IC C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals)

L72 ANSWER 11 OF 11 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1979:94463 HCAPLUS
 DOCUMENT NUMBER: 90:94463
 TITLE: Recovery of hydrogen and oxygen from

INVENTOR(S): water
Barnert, Heiko; Perec, Mieczyslaw; Struck, Bernd
Dieter
PATENT ASSIGNEE(S): Kernforschungsanlage Juelich G.m.b.H., Fed. Rep.
Ger.
SOURCE: Ger. Offen., 11 pp.
CODEN: GWXXBX
DOCUMENT TYPE: Patent
LANGUAGE: German
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
DE 2728171	A1	19790104	DE 1977-2728171	197706 23
			<--	
DE 2728171	B2	19810611		
DE 2728171	C3	19820325		
FR 2395332	A1	19790119	FR 1978-17904	197806 15
			<--	
FR 2395332	B1	19850517		
NL 7806580	A	19781228	NL 1978-6580	197806 19
			<--	
NL 185159	B	19890901		
NL 185159	C	19900201		
BE 868307	A1	19781221	BE 1978-188720	197806 21
			<--	
JP 54010295	A	19790125	JP 1978-74322	197806 21
			<--	
JP 61006001	B	19860222		
GB 2002031	A	19790214	GB 1978-27560	197806 21
			<--	
GB 2002031	B	19820113		
US 4164457	A	19790814	US 1978-917842	197806 22
			<--	
PRIORITY APPLN. INFO.:			DE 1977-2728171	A 197706 23
			<--	

AB In the process for recovering H and O from H₂O, the H₂O and SO₂ are fed into an electrolytic cell. H⁺ ions are liberated electrochem. by the anodic oxidation of the SO₂ with the decomposition of H₂O and the formation of H₂SO₄ in the anolyte. H gas is produced electrolytically from H⁺ on the cathode. Electrolyte solution for the evaporation of H₂O is taken from the

anode chamber (of the cell), which is separated by a membrane from the cathode chamber. After successful evaporation, the anhydride thereby formed is decomposed by heating with the formation of O and SO₂ gases. The SO₂ is oxidized on an anode consisting of C and/or graphite using a very small amount of HI in the anolyte. The HI found together with the H₂O in the portion of the electrolyte taken from the anode chamber is evaporated. Then the evaporated H₂O together with the vaporized HI is returned to the anode chamber. The lowest concentration of HI in the anolyte is 0.005 weight%. For example, an anode of graphite and an aqueous H₂SO₄ solution of 50 weight% saturated with SO₂ and containing 0.005 weight% HI were

used.

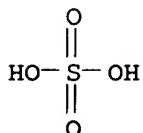
The temperature was 50°, total pressure 1 bar, and the electrolyte was stirred. A c.d. of 100 A/cm² at a p.d. of 0.6 V vs. the reversible H electrode in a similar solution was attained. Comparison tests were also run.

IT 7664-93-9P, preparation

RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, in electrorecovery of hydrogen and oxygen from water containing sulfur dioxide and hydrogen iodide)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC C25B001-04

CC 72-10 (Electrochemistry)

Section cross-reference(s): 49

ST hydrogen oxygen electrorecovery water; iodide hydrogen
oxygen electrorecovery water; sulfur dioxide hydrogen
oxygen electrorecovery

IT Oxidation catalysts

(electrochem., hydrogen iodide, for hydrogen and oxygen recovery from water containing sulfur dioxide)

IT 7782-42-5

RL: USES (Uses)

(anodes, for hydrogen and oxygen recovery from water containing sulfur dioxide and hydrogen iodide)

IT 7664-93-9P, preparation

RL: FORM (Formation, nonpreparative); PREP (Preparation)
(formation of, in electrorecovery of hydrogen and oxygen from water containing sulfur dioxide and hydrogen iodide)

IT 10034-85-2

RL: PRP (Properties)

(in sulfur dioxide oxidation in electrorecovery of hydrogen and oxygen from water)

IT 7446-09-5P, reactions

RL: RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(oxidation of, electrochem., hydrogen and oxygen recovery from water in relation to)

IT 1333-74-0P, preparation 7782-44-7P, preparation

RL: PREP (Preparation)

(recovery of, from water by electrolysis)

=> d 173 ibib abs hitstr hitind 1-9

L73 ANSWER 1 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 2001:563778 HCAPLUS

DOCUMENT NUMBER: 135:139356

TITLE: Preparation of polyphosphoric acid-containing expanded graphite intercalation compounds as sealing and packing materials

INVENTOR(S): Ottinger, Oswin; Malik, Hubert

PATENT ASSIGNEE(S): SGL Carbon A.-G., Germany

SOURCE: Eur. Pat. Appl., 16 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent

LANGUAGE: German

FAMILY ACC. NUM. COUNT: 1

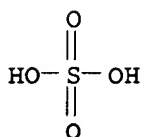
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 1120378	A2	20010801	EP 2001-100048	20010109
EP 1120378	A3	20010905		
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
DE 10003927	A1	20010802	DE 2000-10003927	20000129
JP 2001247302	A	20010911	JP 2001-14289	20010123
US 2001018040	A1	20010830	US 2001-770716	20010125
US 6645456	B2	20031111		
CA 2332756	A1	20010729	CA 2001-2332756	20010126
PRIORITY APPLN. INFO.:			DE 2000-10003927 A	20000129

AB Expanded graphite intercalation compds. are prepared from thermal polyphosphoric acid, which is added as a solution with a addnl. intercalating components to crystalline layered graphite particles. The solution containing the intercalating materials (which included a strong concentrated acid and an oxidizing agent, in the absence of added water) is then reacted with the graphite at from -10° to 80°; following intercalation, the composition is then rapidly heated to 500-800° and expanded. The oxidizing agents are selected from red fuming nitric acid, hydrogen peroxide, and peroxosulfuric acid. The products can be processed to form lightwt.

materials, with bulk d. ≤ 3 g/L, that have use as graphite foils, laminates, sealing materials, packing materials (e.g., rings and fabric).

IT 7664-93-9P, Sulfuric acid, preparation
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (concentrated, expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 RN 7664-93-9 HCAPLUS
 CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-00
 ICS C01B031-04
 CC 49-1 (Industrial Inorganic Chemicals).
 Section cross-reference(s): 47
 ST intercalation expanded graphite polyphosphoric acid; nitric acid expanded graphite polyphosphoric acid; oxidizer expanded graphite polyphosphoric acid; sealing material expanded graphite
 IT Cellular materials
 Oxidizing agents
 (preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 IT 7664-93-9P, Sulfuric acid, preparation
 7697-37-2P, Nitric acid, preparation
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (concentrated, expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)
 IT 7722-84-1P, Hydrogen peroxide, preparation
 13445-49-3P, Peroxodisulfuric acid
 RL: PRP (Properties); SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
 (expanded graphite intercalates containing; preparation of polyphosphoric acid-containing expanded graphite intercalation compds. as sealing and packing materials)

L73 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1995:780686 HCAPLUS

DOCUMENT NUMBER: 123:174314

TITLE: Manufacture of acid-treated graphite for making expanded graphite

INVENTOR(S): Ishikawa, Kojiro; Doi, Tei; Yamamoto, Toshihide; Sugimoto, Hisanori

PATENT ASSIGNEE(S): Nippon Kokuen Kogyo Kk, Japan; Nippon Graphite Industries, Ltd.

SOURCE: Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 07157303	A	19950620	JP 1993-302856	19931202
JP 3540348	B2	20040707	JP 1993-302856	19931202

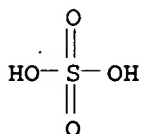
PRIORITY APPLN. INFO.: <--

AB The manufacture comprises adding $\geq 90\%$ concentration H_2SO_4 into graphite particles and stirring to give pastes, cooling to $\leq 10^\circ$, and adding aqueous H_2O_2 with temperature $\leq 10^\circ$ into the pastes by stirring to oxidize the graphite powders. The graphite may be scaly graphite, thermally decomposed graphite, and/or kitsch graphite. The manufacture of expanded graphite comprises heating the acid-treated graphite at $\geq 700^\circ$.

IT 7664-93-9, Sulfuric acid, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (acid treatment of graphite and manufacture of expanded graphite)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-04
 ICS C09C001-46

CC 49-1 (Industrial Inorganic Chemicals)

IT 7664-93-9, Sulfuric acid, processes 7722-84-1,
 Hydrogen peroxide, processes
 RL: PEP (Physical, engineering or chemical process); PROC (Process)
 (acid treatment of graphite and manufacture of expanded graphite)

L73 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1993:583977 HCAPLUS

DOCUMENT NUMBER: 119:183977

TITLE: Manufacture of expanded carbon

INVENTOR(S): Kral, Pavel; Troller, Pavel; Tacl, Alexandr;
 Kriz, Vaclav; David, Jiri

PATENT ASSIGNEE(S): Rudne Doly Pribram S. P., Czech.

SOURCE: Czech., 4 pp.
 CODEN: CZXXA9

DOCUMENT TYPE: Patent

LANGUAGE: Czech

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
-----	----	-----	-----	-----

CS 275568

B2

19920219

CS 1989-6508

198911
17

PRIORITY APPLN. INFO.:

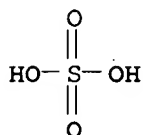
<--
CS 1989-6508198911
17

AB The process comprises leaching C particles, preferably natural graphite, with a mixture containing H₂SO₄ or oleum, H₂O₂, and H₃BO₃ or its salt, washing the leached particles with water, drying, and thermal expansion.

IT 7664-93-9, Sulfuric acid, uses
RL: USES (Uses)
(leaching with mixture containing, of natural graphite, in expanded carbon manufacture)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-02

CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 57

ST carbon expanded manuf; graphite natural leaching expanded carbon; hydrogen peroxide leaching graphite expanded carbon; sulfuric acid leaching graphite expanded carbon; oleum leaching graphite expanded carbon; boric acid leaching graphite expanded carbon

IT 1330-43-4, Sodium tetraborate 7664-93-9, Sulfuric acid, uses 7722-84-1, Hydrogen peroxide, uses 8014-95-7, Oleum 10043-35-3, Boric acid, uses
RL: USES (Uses)
(leaching with mixture containing, of natural graphite, in expanded carbon manufacture)

IT 7440-44-0P, Carbon, preparation 7782-42-5P, Graphite, preparation
RL: PREP (Preparation)
(manufacture of expanded, by leaching natural graphite with mixture containing hydrogen peroxide and sulfuric acid and boric acid or borate salt)

L73 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1991:474592 HCAPLUS

DOCUMENT NUMBER: 115:74592

TITLE: Expanded graphite and its preparation and use in removing oil from water

INVENTOR(S): Maryasin, Ilya; Shelef, Gedaliah; Sandbank, Enrico

PATENT ASSIGNEE(S): Technion Research and Development Foundation Ltd., Israel

SOURCE: Eur. Pat. Appl., 4 pp.

CODEN: EPXXDW

DOCUMENT TYPE: Patent
 LANGUAGE: English
 FAMILY ACC. NUM. COUNT: 2
 PATENT INFORMATION:

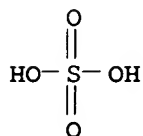
PATENT NO. -----	KIND ----	DATE -----	APPLICATION NO. -----	DATE
EP 435766	A2	19910703	EP 1990-403756	199012 24
EP 435766	A3	19920102	<--	
R: BE, DE, DK, FR, GB, IT, NL				
CA 2032965	A1	19910626	CA 1990-2032965	199012 21
AU 9068463	A	19910627	AU 1990-68463	199012 24
JP 04219307	A	19920810	JP 1990-418190	199012 25
PRIORITY APPLN. INFO.:			IL 1989-92872	A 198912 25

AB Expanded graphite having hydrophobic and lyophobic particular vermicular structure has sp. d. 0.003-0.1 g/mL, surface area 50-200 m²/g, and closed pores 3-20% and is used for absorbing large amts. of petroleum products, mineral oils, and vegetable oils from water. The graphite can be in the form of particulate, pillows, blankets, boom, or as a filter medium. The oil absorbed onto the expanded graphite can be released either by pressure or recovered by solvent extraction. The expanded graphite is prepared by treating graphite with a concentrated oxidizing agent (Na dichromate) solution in H₂SO₄ and subsequently heating at >800°.

IT 7664-93-9, Sulfuric acid, uses and miscellaneous
 RL: USES (Uses)
 (in expanded graphite manufacture)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM C01B031-00
 ICS B01J020-00; C02F001-28; C09K003-32; B01D017-022; C11B003-10
 CC 49-1 (Industrial Inorganic Chemicals)
 ST graphite expanded vermicular structure manuf; petroleum product absorption expanded graphite; mineral oil absorption expanded

graphite; vegetable oil absorption expanded graphite; sodium dichromate expanded graphite manuf; sulfuric acid expanded graphite manuf

IT Petroleum products
Hydrocarbon oils
Olive oil
RL: USES (Uses)
(absorption of, from water, expanded graphite with hydrophobic and lyophobic vermicular structure for)

IT Oils, glyceridic
RL: USES (Uses)
(vegetable, absorption of, from water, expanded graphite with hydrophobic and lyophobic vermicular structure for)

IT 7782-42-5P, Graphite, preparation
RL: PREP (Preparation)
(expanded, with hydrophobic and lyophobic vermicular structure, for absorbing petroleum products and oils from water)

IT 7664-93-9, Sulfuric acid, uses and miscellaneous
RL: USES (Uses)
(in expanded graphite manufacture)

IT 10588-01-9
RL: USES (Uses)
(oxidizing agent, in expanded graphite manufacture)

L73 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1991:148954 HCAPLUS
DOCUMENT NUMBER: 114:148954
TITLE: Manufacture of pinhole-free graphite sheets
INVENTOR(S): Mercuri, Robert Angelo; Getz, George; Greinke, Ronald Alfred; Howard, Ronald Albert
PATENT ASSIGNEE(S): UCAR Carbon Technology Corp., USA
SOURCE: Eur. Pat. Appl., 5 pp.
CODEN: EPXXDW
DOCUMENT TYPE: Patent
LANGUAGE: English
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
EP 406008	A1	19910102	EP 1990-307148	199006 29
EP 406008	B1	19940921		
R: DE, FR, GB				
CA 2020148	A1	19901231	CA 1990-2020148	199006 29
CA 2020148	C	19950711		
JP 03045509	A	19910227	JP 1990-174291	199006 30
JP 2555212	B2	19961120		
US 5149518	A	19920922	US 1990-574807	199008 30

PRIORITY APPLN. INFO.:

<--
US 1989-373924

A

198906
30

AB The sheets, having thickness <0.203 mm, are manufactured by providing graphite particles having purity >97%, intercalating the particle with an oxidizing agent, washing and drying the intercalated particles, rapidly expanding the dried particles in a furnace preheated at >2000 °F to sp. volume >450 cm³/g, and compressing the expanded graphite in the absence of a binder into a sheet having thickness <0.203 mm.

IT 12777-87-6P

RL: PREP (Preparation)

(manufacture of, in superthin sheet manufacture)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

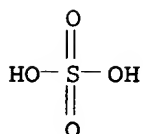
CCI MNS

C

CM 2

CRN 7664-93-9

CMF H2 O4 S



IC ICM C04B035-54

CC 57-8 (Ceramics)

IT Acids, compounds

RL: USES (Uses)

(oxidizing, inclusion compds. with graphite, manufacture of,
in superthin sheet manufacture)

IT Sheet materials

(superthin, manufacture of, graphite intercalation compds. with
oxidizing agents for)

IT 12672-65-0P 12777-87-6P

RL: PREP (Preparation)

(manufacture of, in superthin sheet manufacture)

L73 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1990:614155 HCAPLUS

DOCUMENT NUMBER: 113:214155

TITLE: Electrically-conductive structural wood-fiber

INVENTOR(S): panels
Ishii, Tatsuo; Suzuki, Takeshi; Hirasawa,
Michiko
PATENT ASSIGNEE(S): Nippon Kasei Chemical Co., Ltd., Japan
SOURCE: Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF
DOCUMENT TYPE: Patent
LANGUAGE: Japanese
FAMILY ACC. NUM. COUNT: 1
PATENT INFORMATION:

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 02220808	A	19900904	JP 1989-44289	198902 23

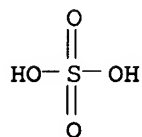
PRIORITY APPLN. INFO.: <-- JP 1989-44289 198902
23

AB Title panels, useful as electromagnetic shields, etc., contain 1-50% acid-treated swollen graphite powder having bulk d. 0.02-0.003 g/mL. Thus, natural graphite flakes (immobilized C 90%, ash content 8%) 40, 98% H₂SO₄ 150, and 60% H₂O₂ 2 parts were mixed 15 min at 30-35°, diluted with 150 parts 30% H₂SO₄, filtered, washed, and dried. The treated graphite was expanded at 1000° for 10 s to give a product (having bulk d. 0.0053 g/mL), which was incorporated (2% based on chips) into **particleboard** as elec. conductor.

IT 7664-93-9, Sulfuric acid, uses and miscellaneous
RL: USES (Uses)
(graphite treated by, as elec. conductors for wood panels)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



IC ICM B27N003-04
ICS H01B001-24

CC 43-9 (Cellulose, Lignin, Paper, and Other Wood Products)

ST elec conductor graphite **particleboard**; fiberboard elec conductor graphite; expanded elec conductor graphite

IT Building materials
(particleboards, acid-treated and expanded graphite powder as elec. conductors for)

IT 7664-93-9, Sulfuric acid, uses and miscellaneous
RL: USES (Uses)
(graphite treated by, as elec. conductors for wood panels)

IT 7722-84-1, Hydrogen peroxide, uses and
miscellaneous
RL: USES (Uses)
(graphite treated with acid containing, by elec. conductors for wood
panels)

L73 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1985:512142 HCAPLUS

DOCUMENT NUMBER: 103:112142

TITLE: The preparation of graphite salts using anodic
oxidation method

AUTHOR(S): Xu, Zhongyu; Mo, Xiaowen

CORPORATE SOURCE: Chem. Chem. Eng. Dep., Hunan Univ. Changsha,
Hunan, Peop. Rep. China

SOURCE: Extended Abstracts and Program - Biennial
Conference on Carbon (1985), 17th,
59-60

CODEN: EAPCDS; ISSN: 0160-7464

DOCUMENT TYPE: Journal

LANGUAGE: English

AB Natural graphite particles were electrochem.
oxidized using a Pt anode and a graphite cathode in
aqueous acidic (H₂SO₄) solns. After the oxidation, the
particles were washed and then dried in an elec.
furnace. The final product was vermiform graphite particles
. Similar expts. were made with HNO₃ and HClO₄. The expansion
degree of the vermiform graphite particles was >300, thus,
this method is effective in preparation of graphite salts when it is used
to prepare flexible graphite material.

IT 12777-87-6P

RL: PREP (Preparation)
(preparation of, by electrochem. oxidation)

RN 12777-87-6 HCAPLUS

CN Sulfuric acid, compd. with graphite (9CI) (CA INDEX NAME)

CM 1

CRN 7782-42-5

CMF C

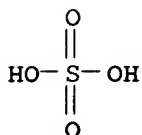
CCI MNS

C

CM 2

CRN 7664-93-9

CMF H2 O4 S



CC 72-4 (Electrochemistry)

Section cross-reference(s): 78

IT 12672-65-0P 12777-87-6P 54511-26-1P
RL: PREP (Preparation)
(preparation of, by electrochem. oxidation)

L73 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1979:129426 HCAPLUS

DOCUMENT NUMBER: 90:129426

TITLE: A study on the anodic impedance of lead(III) oxide(lead) electrode during suspension-electrolysis leaching of β -zinc sulfide in 1N sulfuric acid solution

AUTHOR(S): Kunieda, Yoshihiko; Oki, Takeo

CORPORATE SOURCE: Dep. Metall., Suzuka Coll. Technol., Suzuka, Japan

SOURCE: Nippon Kinzoku Gakkaishi (1979), 43(2), 86-93

CODEN: NIKGAV; ISSN: 0369-4186

DOCUMENT TYPE: Journal

LANGUAGE: Japanese

AB The double layer capacitance of the PbO₂(Pb) electrode is very high. The equivalent circuit at the interface consists of a frequency-dependent polarization resistance and the double layer capacitance in parallel. On the anode of suspension-electrolysis, the graphite particles are oxidized electrochem. to (C-O) or (C-OH) at the surface of PbO₂(Pb) anode and the oxidation current increases with increasing amount of suspension. The PbO₂(Pb) anode reaction in the electrolyte suspending only β -ZnS is the oxidation of H₂S with the active O generated by the discharge of H₂O. In a low electrode potential region, the oxidation is controlled by both the charge-transfer process of the producing the active O and the diffusion process of the product, H⁺. In a high electrode potential region, the anode reactions are dominated by the 1st order chemical oxidation of H₂S by the active O and the diffusion process of the product, H⁺. In the case of the suspension system β -ZnS + graphite powder with the addition of Fe³⁺, the oxidation current is remarkably larger than the electrolyte without these substances. The reactions are mainly the oxidation of Fe²⁺ and the oxidation of H₂S, which is generated by the leaching of β -ZnS in acidic solution, with the subsequently produced Fe³⁺. The processes of the 1st order chemical oxidation of H₂S by Fe³⁺ and the diffusion of Fe²⁺ dominate the anode reaction.

CC 72-7 (Electrochemistry)

Section cross-reference(s): 54, 76

IT 7439-89-6, properties

RL: PRP (Properties)

(elec. impedance of lead oxide-lead anode in suspension electrolysis leaching of zinc sulfide in sulfuric acid containing graphite powder and)

L73 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2007 ACS on STN

ACCESSION NUMBER: 1967:97321 HCAPLUS

DOCUMENT NUMBER: 66:97321

TITLE: Oxidation of natural graphite and pregraphitic material by a mixture of sulfuric and nitric acids

AUTHOR(S): Gasparoux, Henry

CORPORATE SOURCE: C.N.R.S., Gironde, Fr.

SOURCE: Comptes Rendus des Seances de l'Academie des Sciences, Serie C: Sciences Chimiques (

1967), 264(4), 376-9
CODEN: CHDCAQ; ISSN: 0567-6541

DOCUMENT TYPE:
LANGUAGE:

Journal
French

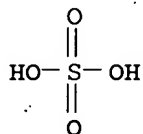
AB Samples of a natural graphite (I) from Madagascar, a pitch cake (II) treated at 2400° for 3 hrs., and pyrolysis carbon (III) deposited at 2100°, of particle size <60 μ, were first characterized by their magnetic susceptibility and their crystallographic parameter d002. Samples were then oxidized by a H2SO4-HNO3 (85:15 by volume) mixture at 80° for a given time before cooling and dilution, filtration, washing, drying at 90°, and degassing at 1000° for 3 hrs. Oxidation reaction rates were 0.85 ± 10^{-4} , 34.4 ± 10^{-4} , and 66.5 ± 10^{-4} /min. for I, II, and III, resp. It was concluded that the acid attacked preferentially crystallites by the edges of their carbon layers, which corresponded with the observation that oxidation was more rapid for the less "organized" or less "graphitic" material.

IT 7664-93-9, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(mixture with nitric acid, oxidation by, of graphite and pregraphitic carbon, mechanism of)

RN 7664-93-9 HCAPLUS

CN Sulfuric acid (8CI, 9CI) (CA INDEX NAME)



CC 52 (Coal and Coal Derivatives)

IT 7664-93-9, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(mixture with nitric acid, oxidation by, of graphite and pregraphitic carbon, mechanism of)

IT 7697-37-2, reactions

RL: RCT (Reactant); RACT (Reactant or reagent)
(mixture with sulfuric acid, oxidation by, of graphite and pregraphitic carbon, mechanism of)

=>